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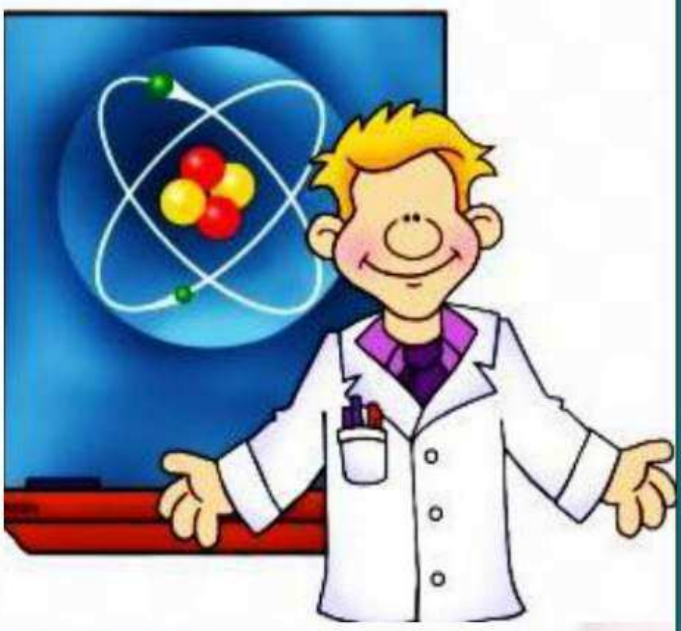
Science Department

Prep. (1) Unit (1)

First term



Name :.....

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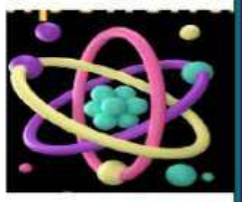
LESSON (1)

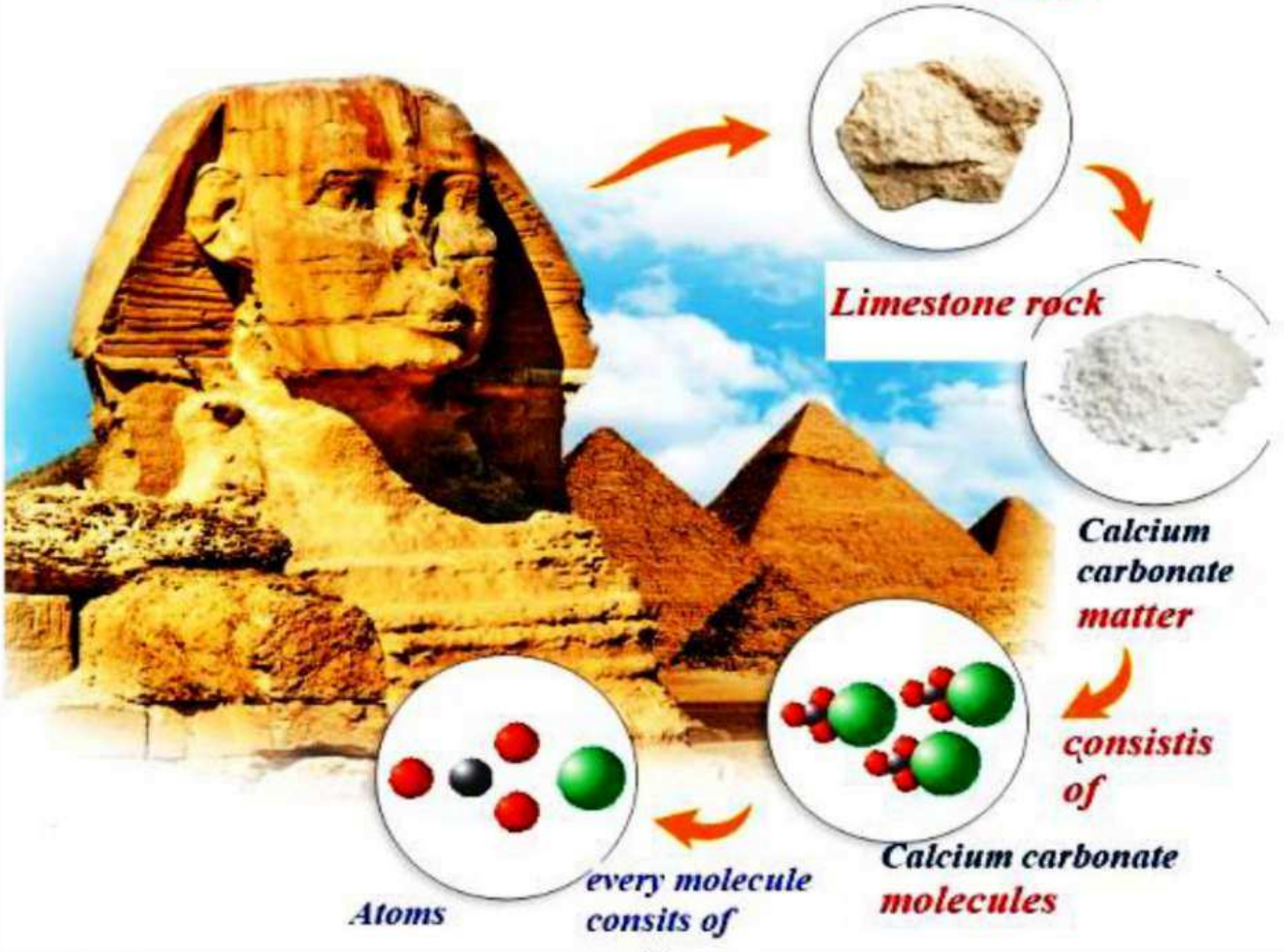
Atomic Structure



Matter : Everything that has volume and mass.

Matter consists of **Molecules** consists of **Atoms.**

Ex: limestone rock consists of calcium carbonate.



Atom is the building and structure unit of any matter.

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- **Dalton** is the scientist who developed the first scientific theory about the atom.
- He stated that atoms are indivisible.

- **Rutherford** (1909) is the first scientist who made the first experimental model of the atom.

Structure of the atom

Nucleus

*At the center of the atom.

* It contains protons & neutrons

- **Protons:** positively charged particles (+ve).
- **Neutrons:** neutral particles (no charge).

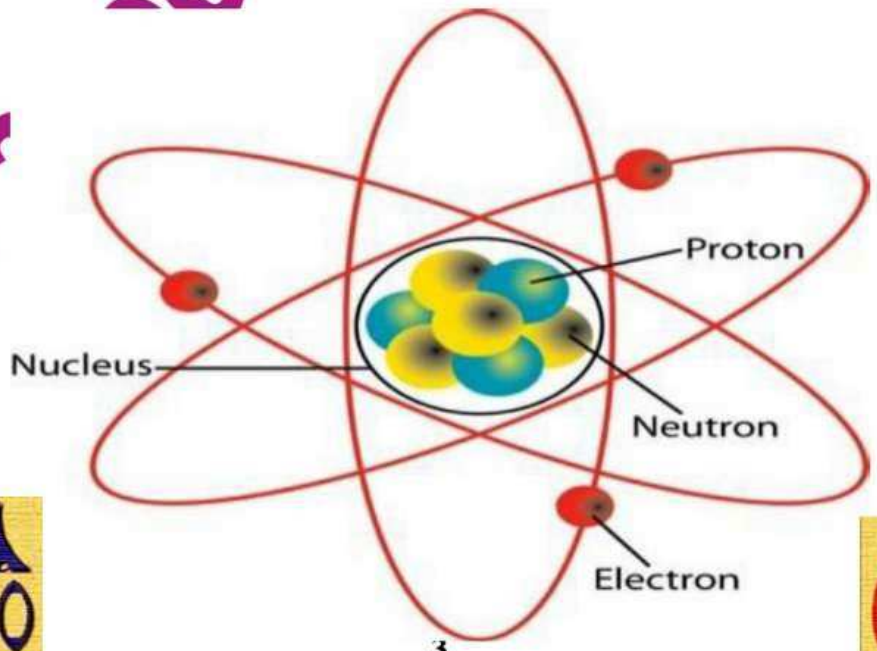
Electrons

*Revolve around the nucleus.

at high speeds in energy levels.

-They are negatively charged particles. (-ve).

Note : protons, neutrons and electrons are subatomic particles.



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- **Atoms are incredibly small (you can't see them with your eyes).**
- **If we represent the size of an atom to the size of a baseball field, the volume of the nucleus is represented by the size of a pin head in the middle of the field.**

Subatomic particle	Symbol	Relative Charge	Mass (u)	location
Proton	P^+	+1	1	Inside nucleus
Electron	e^-	-1	1/1836	In energy level around the nucleus
Neutron	n^0	0	1	Inside nucleus

Notes:

1-The charge of a proton is equal in magnitude to the charge of an electron, but differs in charges type.

2-The masses of subatomic particles are measured in atomic mass units (U).

3-The mass of electrons is negligible compared to the mass of protons or neutrons.

4- The number of electrons is equal to the number of protons ,so The atom is electrically neutral at ordinary state.

Give reason:

1-The mass of the atom is concentrated in the nucleus.

-Because the mass of electrons is very small compared to the mass of protons or neutrons within the nucleus.

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2- The atom is electrically neutral at ordinary state.

-Because the number of negative electrons is equal to the number of positive protons.

Some elements and their symbols

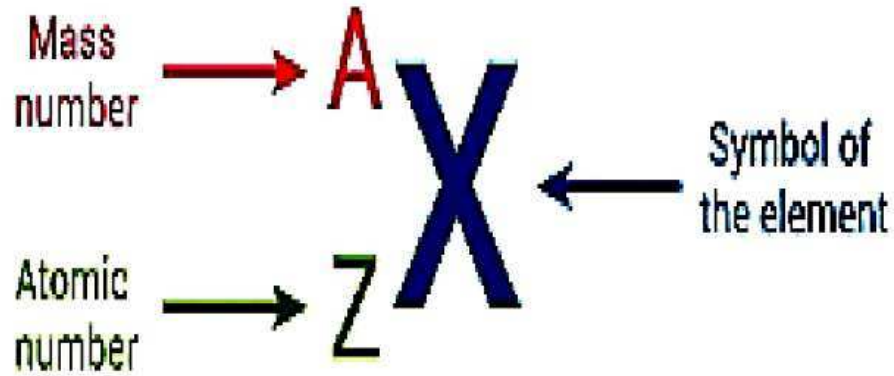
Element's name in English	In Latin	Symbol
Sodium	Natrium	Na
Potassium	Kalium	K
Copper	Cuprum	Cu
Iron	Ferrum	Fe
Carbon	Carbo	C
Nitrogen	Nitrogenium	N
Chlorine	Chlorum	Cl
Chromium	Chromium	Cr

-The element's symbol may be:

1- One capital letter (such as H , N ,O) .

2- Two letters: the first is Capital and the second is small (such as Na, Fe, Cl).

-Any element represents by: symbol, atomic number and mass number.



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Examples of Symbols of Some Famous Elements

Element	Symbol	Element	Symbol	Element	Symbol
Hydrogen	H	Potassium	K	Iodine	I
Helium	He	Magnesium	Mg	Carbon	C
Mercury	Hg	Lithium	Li	Calcium	Ca
Oxygen	O	Zinc	Zn	Chlorine	Cl
Fluorine	F	Nitrogen	N	Copper	Cu
Iron	Fe	Neon	Ne	Chromium	Cr
Phosphorus	P	Sodium	Na	Argon	Ar
Lead	Pb	Boron	B	Aluminum	Al
Sulphur	S	Beryllium	Be	Gold	Au
Silicon	Si	Bromine	Br	Silver	Ag

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Give reason:

1- Scientists agreed to express the chemical elements by certain symbols .

- To facilitate their expression and writing, especially in chemical equations.

Mass number(A) : the sum of number of positive protons(P) and number of neutral neutrons (n) in the nucleus.

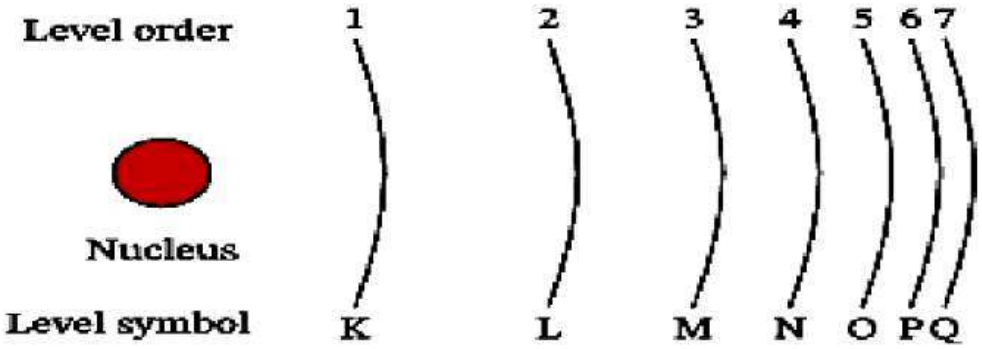
Atomic number (Z): the number of positive protons (p^+) Or the number of negative electrons (e^-)

To calculate the number of neutrons :

* Mass number (A) - atomic number (Z)

* Number of nucleons = mass number (A)

-The energy levels: They are imaginary regions around the nucleus in which the electrons move according to their energies.



-They are 7 energy levels in the heaviest atom represented by:

K, L, M, N, O, P, Q

-As we go up from level 1 (K) to level 2 (L) the energy increases and so on.

Note: the number of protons may equal the number of neutrons in the nuclei of some atoms or the number of neutrons may exceed the number of protons in the nuclei of other atoms.

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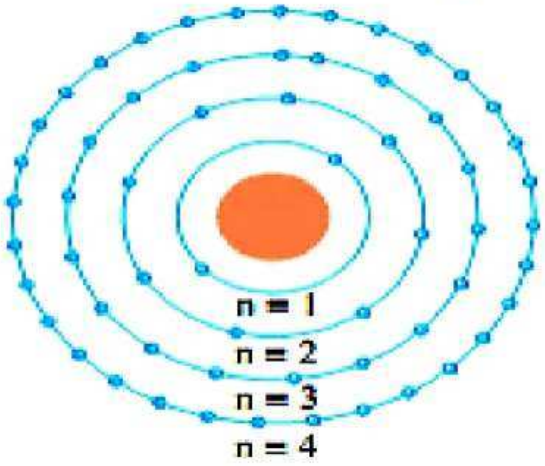
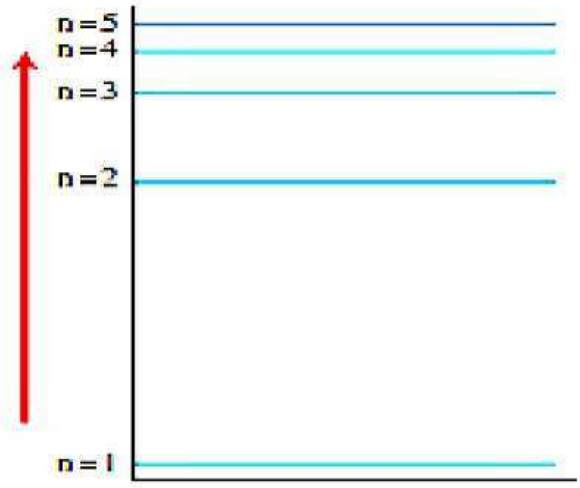




-**The no. of electron which saturates the first four energy levels can be calculated from relation $2n^2$ (n : number of energy level) so:**

The no. of electrons in energy level :

(k) =2× (1) 2 =2 **(L)=8**

(M)=18 **(N)=32**

- Each main energy level contains some energy sublevels.

- The outer most energy level of any atom can't take more than 8 electrons except (k) which saturated with (2) electrons.

Example:

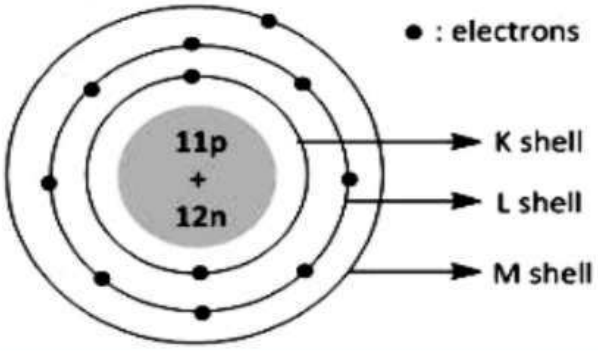
Write the electronic configuration of the following and mention the number of electrons ,protons and neutrons:

$^{1-}$ Sodium $^{23}_{11}Na$

No. of electrons :11

No. of protons :11

No. of neutrons = 23-11 =12



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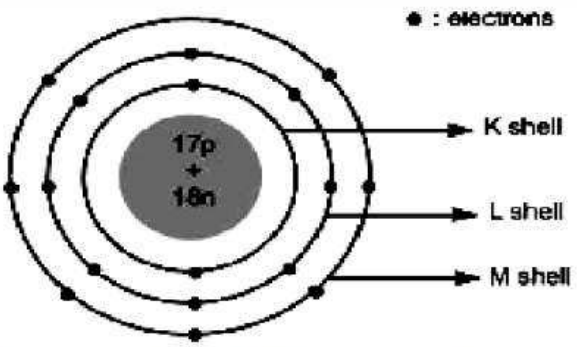
2- Chlorine $^{35}_{17}C$

No. of electrons :17

No. of protons :17

No. of neutrons = 35-17 =18

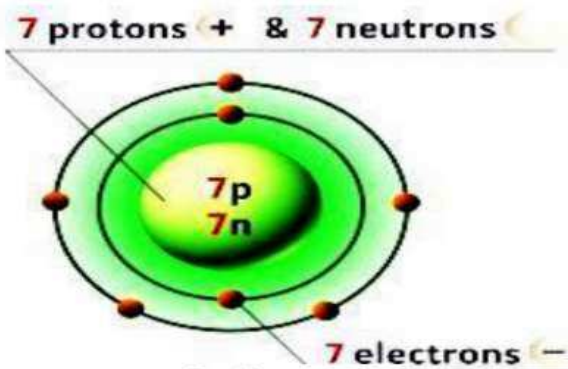


3-Nitrogen $_{7}^{14}N$

No. of electrons = 7

No. of protons =7

No. of neutrons = 14 -7 =7

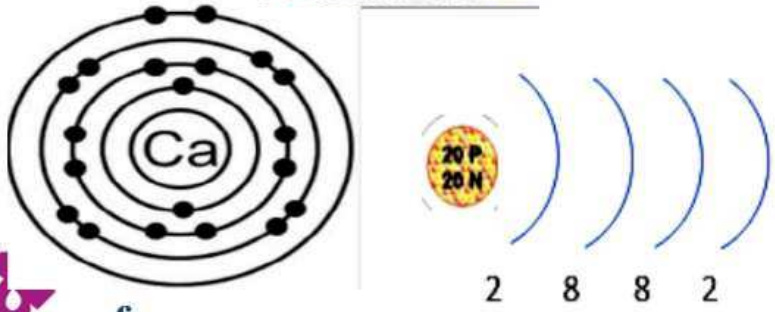


4-Calcium $_{20}^{40}Ca$

No. of electrons = 20

No. of protons =20

No. of neutrons = 40-20=20



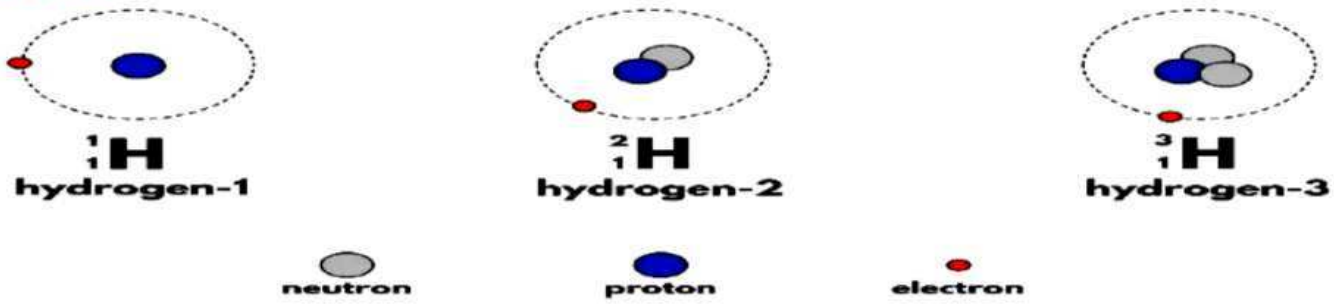
Isotopes: they are different forms of the same element have the same number of protons but different numbers of neutrons, leading to differences in atomic mass.

Example (1): Hydrogen has 3 isotopes:

1-Hydrogen-1 (Protium): The most abundant isotope, it has only one proton in its nucleus and no neutrons.

2-Hydrogen-2 (Deuterium): It has one proton and one neutron in its nucleus.

-Hydrogen-3 (Tritium): It has one proton and two neutrons in its nucleus.



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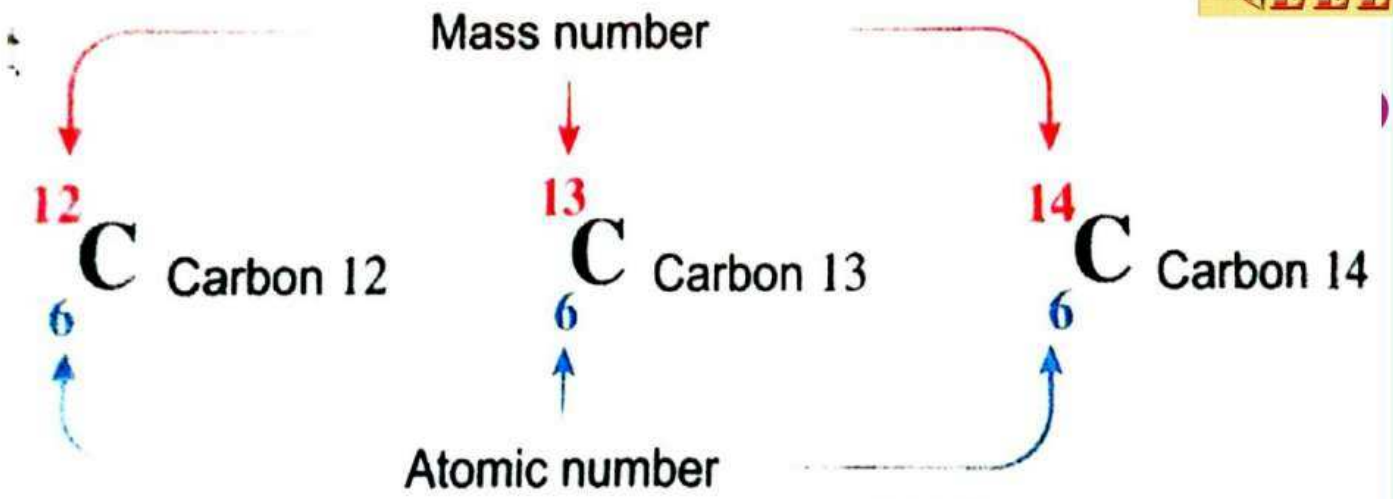
Example (2): carbon has 3 isotopes:



Example (3): Magnesium has 3 isotopes:

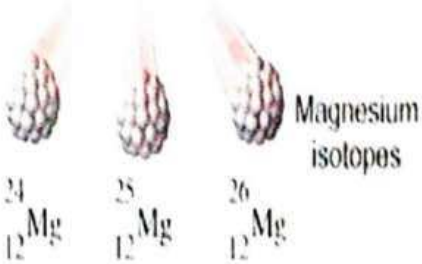
Magnesium Mg has 3 isotopes :

- Magnesium – 24 , It's symbol $^{24}_{12}Mg$
- Magnesium – 25 , It's symbol $^{25}_{12}Mg$
- Magnesium – 26 , It's symbol $^{26}_{12}Mg$

How many nucleons are found in the nucleus of each magnesium atom isotope?

Magnesium tape

Magnesium atoms



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What is the only hydrogen isotope that does not have neutrons in its nucleus? *Protium $_1H^1$*

G.R. isotopes of the element differ in mass number?

Due to the difference in the numbers of neutrons in the nuclei of the element's isotopes.

Check your understanding

The elements	(1)	(2)	(3)	(4)	(5)
The protons	20	16	16	7	8
The neutrons	20	20	18	8	9

Which two atoms represent two isotopes of the same element?

.....

Life application

Fertilizers:

- They are chemical compounds used to improve crop yield.
- Fertilizers are composed of three compounds containing these elements.
- NPK fertilizer is one of the most important types of fertilizers.

-Nitrogen (N): healthy green colour.

-Phosphorus (P): strengthen the roots.

-Potassium(K): healthy plant growth.

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Worksheet (1)

Q.1) Write the scientific term:

1- Anything that has mass and occupies a space. ( )

2- The building unit of matter. ( )

3- An element involved in the composition of fertilizers, necessary for strengthening roots.
( )

4-The total number of protons and neutrons in the nucleus of an atom. ( )

5-Negatively charged particles that revolve around the nucleus at high speeds.

6- Positively charged particles found inside the nucleus of an atom. ( )

7-Neutral particles found inside the nucleus of an atom. ( )

8-The difference between the mass number and the atomic number in the nucleus of an atom. ( )

9- They are different forms of the same element have the same number of protons but different numbers of neutrons. ( )

Q.2) Choose the correct answer :

1-What is the smallest subatomic particle in terms of mass?
a-proton b-electron c-neutron d-nucleus

2-The nucleus of an atom carries …….
a-positive b-negative c-neutral d-no charge

3- Which of the following elements is not a component of NPK fertilizer?
a-Phosphorus b- Sodium c- Nitrogen d- Potassium

4- The number of protons in lithium atom $^{7}_{3}Li$ is equal ……

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a-7 b-4 c-3 d-10

5-The symbol of sodium atom is……..

a-So b-Na c-Ar d-Hg

6- The number of energy level in the heaviest atom =…….levels.

a-3 b-5 c-7 d-8

7- The last energy level saturated by…….electrons, except the K level.

a-2 b-8 c- 18 d- 32

8- The atomic number of an element $^{40}_{18}Ar$ is…….

a-18 b-40 c-32 d-15

9- Which of the following subatomic particles has a mass of 1 U ?

a-Protons only b-Electrons only

c-neutrons and electrons d-neutrons and protons

10- All atoms of the same element agree in……

a-Mass number b-number of electrons

c-number of neutrons d-number of nucleons

Q.3)Write the symbols of the following :

1- oxygen :……. 2-hydrogen :……

3-iron:…… …. 4-silicon:……

5-carbon:…….. 6-Sodium:……

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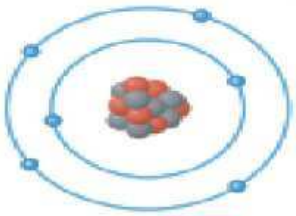
Q.4) The opposite figure represents an atom (X)

What is the symbol of this element .....



a- $_{12}^{6}X$ b- $_{4}^{4}X$ c- $_{6}^{13}X$ d- $_{6}^{6}X$

Q.5) Problems:

1-An element has 3 energy levels; the outermost energy level contains 3 electrons and the nucleus has 14 neutrons.

Calculate 1-the atomic number.

2-mass number.

.....

.....

2-Element (Y) its nucleus has 20 neutral particles and mass number = 39,

Calculate :

a- No. of negative charged particles.

b- Write the symbol of this element and mention number of A and Z

.....

.....

Q.6) Write the electronic configuration of the following:

1- $^{39}_{19}K$

2- $^{27}_{13}Al$

3- $^{20}_{10}Ne$

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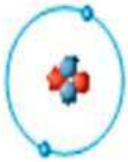
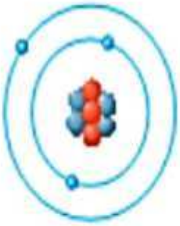
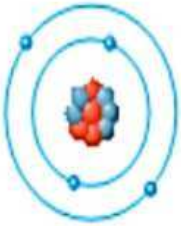
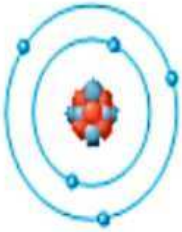
Q.7) In the opposite figure:

	Hydrogen H	Helium He	Lithium Li	Beryllium Be	Boron B
Proton ● Neutron ● Electron ●					

and choose the appropriate mathematical sign (= ,< , >) to express the appropriate relationship between:

The elements	$_1H^1$	He	Li	Be	B
No of protons					
No of neutrons					
No of Electrons					
The relationship between the numbers of protons and electrons	p…..e-	p…..e-	p…..e-	p…..e-	p…..e-
The relationship between the numbers of protons and neutrons	p…..n	p…..n	p…..n	p…..n	p…..n

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LESSON (2) Atomic Structure

Scientist classified elements according to their properties in order to:

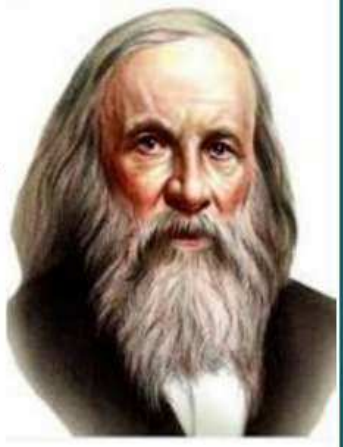
1- Facilitate their study.

2 -Find a relationship between physical and chemical properties of elements.

The most important attempts to classify elements are:

- Mendeleev's Periodic table
- Moseley's periodic table
- Modern periodic table.

Mendeleev's periodic table



- It is considered the first real attempt to classify elements.
- Mendeleev arranged the elements according to atomic masses.
- He arranged the elements in vertical columns known as (groups) and from the left to right in horizontal rows known as (periods)
- He discovered that the properties of elements are repeated regularly at the beginning of each period

I	II	III	IV	V	VI	VII	VIII		
H 1.01									
Li 6.94	Be 9.01	B 10.8	C 12.0	N 14.0	O 16.0	F 19.0			
Na 23.0	Mg 24.3	Al 27.0	Si 28.1	P 31.0	S 32.1	Cl 35.5			
K 39.1	Ca 40.1		Ti 47.9	V 50.9	Cr 52.0	Mn 54.9	Fe 55.9	Co 58.9	Ni 58.7
Cu 63.5	Zn 65.4			As 74.9	Se 79.0	Br 79.9			
Rb 85.5	Sr 87.6	Y 88.9	Zr 91.2	Nb 92.9	Mo 95.9		Ru 101	Rh 103	Pd 106
Ag 108	Cd 112	In 115	Sn 119	Sb 122	Te 128	I 127			
Cs 133	Ba 137	La 139		Ta 181	W 184		Os 194	Ir 192	Pt 195
Au 197	Hg 201	Tl 204	Pb 207	Bi 209					
			Th 232		U 238				

Mendeleev was honored by naming one of the discovered elements by his name called Mendelevium (Md).

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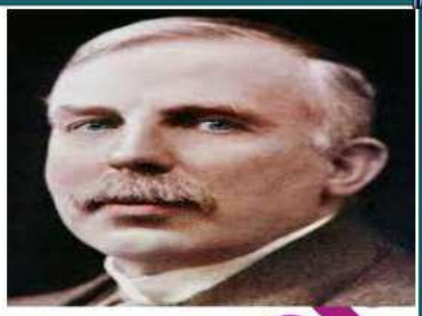
2- Moseley's periodic table



Rutherford: discovered that the nucleus of an atom contains **positively charged protons** and their number is known as **atomic number**.

*** Moseley:** discovered that the properties of elements related to their *atomic number* **not their** *atomic masses.*

So Moseley:

1- He arranged elements in ascending order according to their atomic Number .

2- He added **nobel (inert gases)** to the table and he added elements which were discovered after Mendeleev.

Give reason: **Mosley arranged elements according to atomic number.**
Because the properties of elements related to their atomic number not their atomic masses.

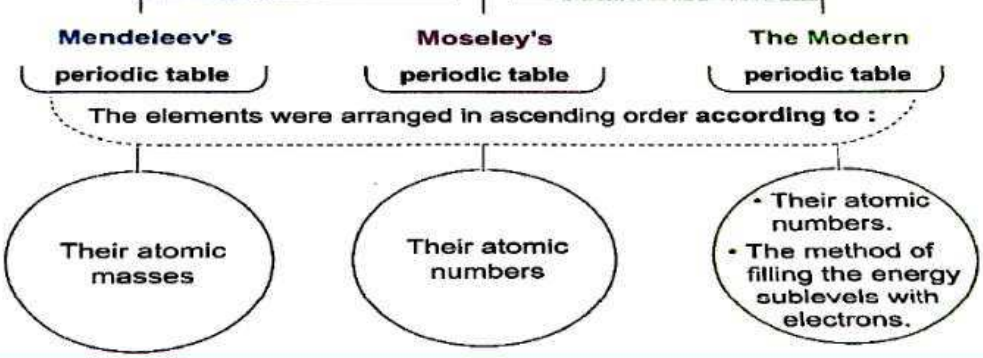
3- Modern periodic table

*** Elements are classified in the modern periodic table in an ascending Order according to:-**

*** Their atomic numbers.**

*** The way of filling the energy sublevels with electron.**

Summarize


Mendeleev's periodic table
Moseley's periodic table
The Modern periodic table
The elements were arranged in ascending order according to :
Their atomic masses
Their atomic numbers
• Their atomic numbers.
• The method of filling the energy sublevels with electrons.

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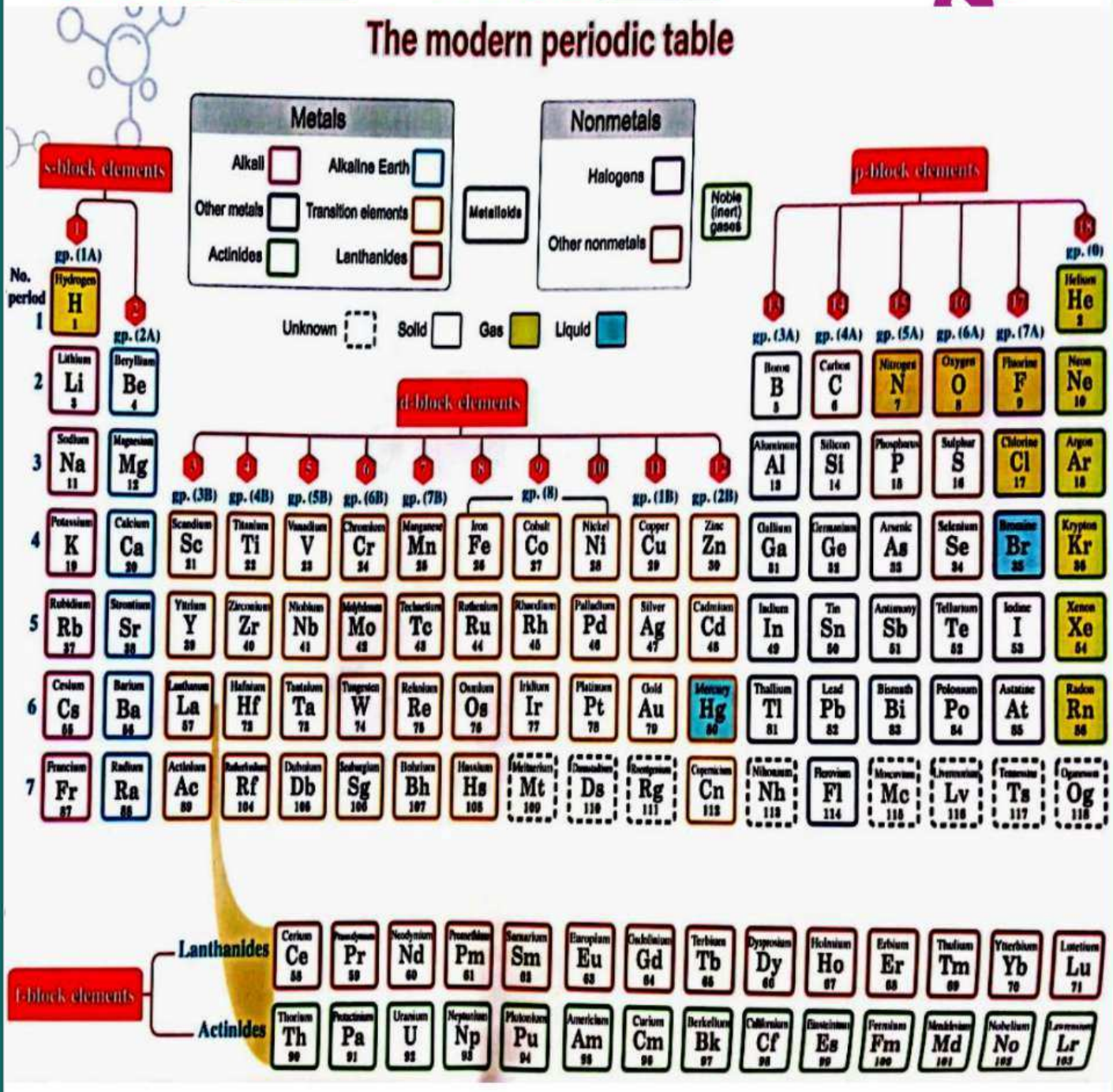
Modern periodic table

- The number of the known element in the modern periodic table is 118 elements, 92 elements of them are available in earth's crust.

*** The modern periodic table consists of:**

7 horizontal periods and 18 vertical groups.



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* How many elements are in each of the first four periods

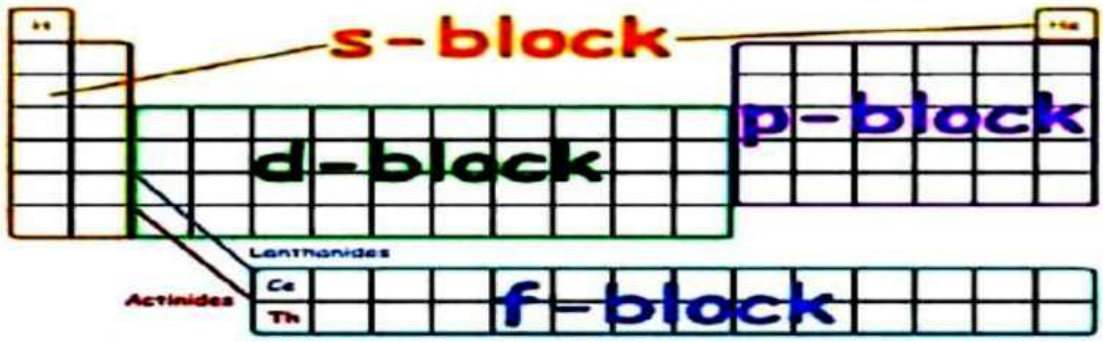
Period number	1	2	3	4
Numbers of elements	2	8	18	18

Classification of elements according to their physical state

Solid	Liquid	Gas
Most of elements are solid Li , Na , C , P , Fe	Mercury (Hg) (metal) Bromine (Br) (nonmetal)	Inert gases (He, Ne, Ar, Kr , Ze ,Rh) Active (nonmetal) gases (H, O , N , Cl , F)

Blocks of modern periodic table:

Modern periodic table consists of 4 blocks S, P, D, F



1-S-block element:-

*located on the left side.

*Includes two groups, takes letter (A) which are (1A & 2A)

Group→	1	2
↓Period		
1	1 H	
2	3 Li	4 Be
3	11 Na	12 Mg
4	19 K	20 Ca
5	37 Rb	38 Sr
6	55 Cs	56 Ba
7	87 Fr	88 Ra

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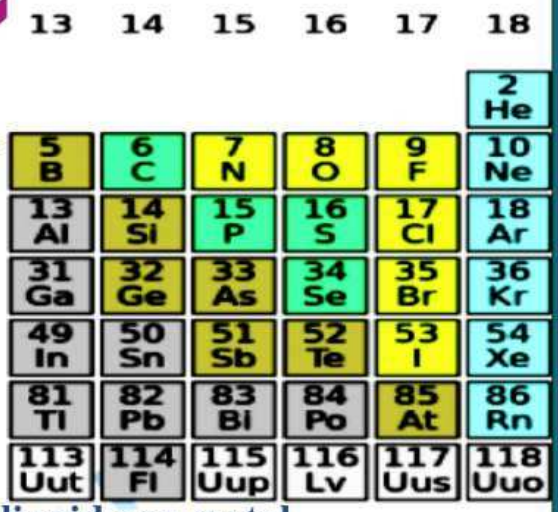
Group (1A)	Group (2A)
✹They are solids except hydrogen is gas. ✹They are all metals. ✹ They have one electron in the outer most energy level. ✹They are called alkali metals. Example: Na $_{11}$Na))) 2 8 1	✹They are solids. ✹They are all metals. ✹All of them have two electrons in the outer most energy level. ✹They are called alkali earth metals Example: Mg $_{12}$Mg))) 2 8 2

2- P –block elements:-



✹Located on the right side of the periodic table.

✹All groups take letter A except Zero group (Group 18) nobel gases

✹It consist of six groups (3A,4A,5A,6A, 7A and zero groups) which take number (13,14,15,16,17and18) in the modern numbers.

✹They are solid or gases except bromine (Br) is liquid non metal.

Group 7A (penultimate group)	Group18 (zero group)
✹They have 7 electrons in the outer most energy level so ✹They are non-metals. ✹They are called Halogen ✹Example: chlorine ($_{17}$Cl)	✹Their outermost energy level is filled with 8 electrons except helium has two electrons. *They are called inert gases (Nobel gases). Example: argon ($_{18}$Ar)

$_{17}$Cl 2 , 8 , 7

$_{18}$Ar 2 , 8 , 8

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Note

P 2 . 8 . 5

Ne 2 . 8

Al 2 . 8 . 3

2- P- block element include:-

Metals as $_{13}Al$, nonmetals as $_{15}P$, nobel (inert gases) as $_{10}Ne$

It also includes all metalloids which can' t be identified from their outermost electrons due to difference in number valence electron.

Metalloid

Elements combine between metals and nonmetal properties

Metalloid	Boron (B)	Silicon (s)	Germanium (Ge)	Arsenic (As)	Antimony (Sb)	Telerium (Te)
Period	2	3	4	4	5	5
Group	3A	4A	4A	5A	5A	6A
Number of outer most electrons	3	4	4	5	5	6

d-block elements:-

	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn
	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd
*		72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg
**		104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn

- Located in the middle of the periodic table between (s, p) blocks (the left side of the periodic table).
- Contain 10 groups.
- They start to appear from period (4).
- Its elements all metals.
- They are called transition metals.

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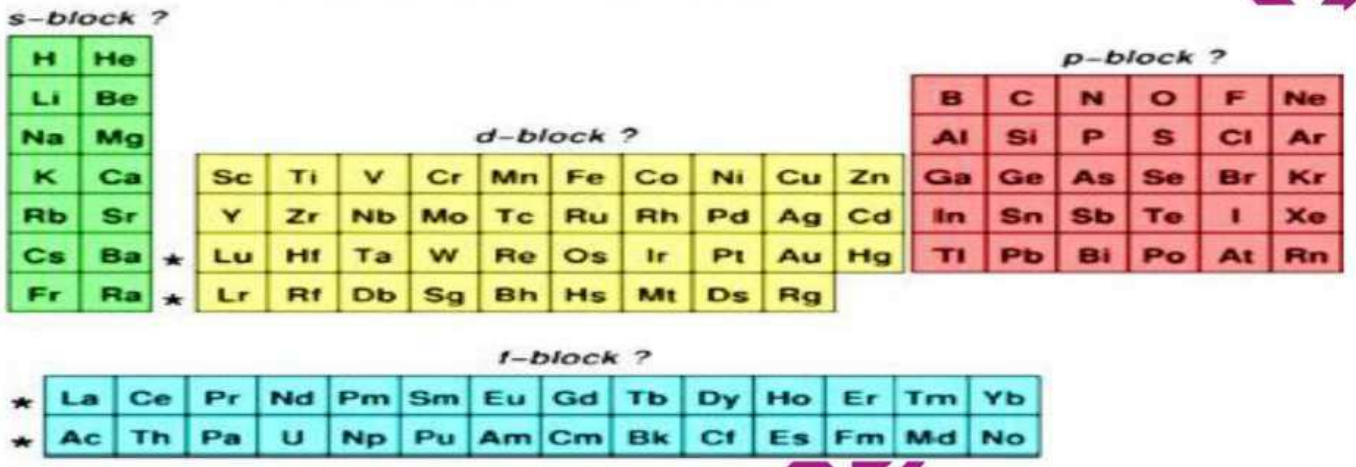
4- F- block elements:-

- They are located at the bottom of the periodic table.
- All of them are metals.
- It includes lanthanides and actinides.


s–block ?
H He
Li Be
Na Mg
K Ca
Rb Sr
Cs Ba
Fr Ra
d–block ?
Sc Ti V Cr Mn Fe Co Ni Cu Zn
Y Zr Nb Mo Tc Ru Rh Pd Ag Cd
Lu Hf Ta W Re Os Ir Pt Au Hg
Lr Rf Db Sg Bh Hs Mt Ds Rg
p–block ?
B C N O F Ne
Al Si P S Cl Ar
Ga Ge As Se Br Kr
In Sn Sb Te I Xe
Tl Pb Bi Po At Rn
f–block ?
La Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb
Ac Th Pa U Np Pu Am Cm Bk Cf Es Fm Md No

Types of element according to electrons in the outermost energy level:

Metals	Non-metals	Inert gases	Metalloid
Contain 1,2,3 Electrons.	has 5,6,7 electrons.	Have 8 except Helium contain 2 electrons.	Have different numbers of electron.

Note

All periods start with metal and end with inert gas except period one starts with hydrogen which is nonmetal.

*Element of the same group:-

They have the same number of electrons in the outer most energy level

*Element of the same period:-

They have the same number of energy levels.

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Give reason:-

Elements of the same group have similar properties.

Because they have the same number of electrons in the outer most energy level

How to determine the location of an element in the periodic table:

Period number = number of energy levels occupied by electron.

Group number = number of electrons in outermost energy level .

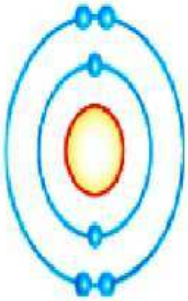
Period (3)

Group (zero , 18)

$_{18}Ar$

2 8 8

:xample:



- Element X its atomic number = 6
- The atomic number of element follows it in the same period = 7
- The atomic number of element follows it in the same group = 14

Note

In the same group:- atomic number of element increases from the preceeding element by 8 electron except lithium increases by (2) electrons.

In the same period:- the atomic number of an element increases from an element preceeding it by (1) electron.

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Element	Electronic configuration	Number of energy levels occupied by electrons	Period number	Number of electrons in the outermost energy level	Group number		Block
					Traditional	Modern	
$_{8}O$		2	2	6	6A	16	p-block
$_{10}Ne$		2	2	8	zero	18	p-block
$_{12}Mg$		3	3	2	2A	2	s-block
$_{2}He$		1	1	2	zero	18	p-block

Valence electron:- are electrons in the last energy level.

Valency of the element:- can be determined from the number of the unpaired electrons in its **Lewis structure**.

Lewis dot structure: the electrons of outermost energy level are represented first by individual points at the four sides of element, then duplicated until all electrons are distributed

Group no.	1A	2A	3A	4A	5A	6A	7A	0
The element	Li	Be	B	C	N	O	F	Ne
Valency	Monovalent	Divalent	Trivalent	Tetravalent	Trivalent	Divalent	Monovalent	0

Note

Determination of element valency by using Lewis dot structure:

1- From (1A -4A): valency of element is represented by number of individual electrons and equals number of its group

No. of valency = no. of electrons in outermost energy level = no. of its group.

2- From (5A – 0):

No. of valency = 8 – no. of electrons in outermost energy levels

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The electronic configuration and properties of elements

The chemical properties of elements depend on the number of electrons in the outermost energy level, while the physical properties depend on the number of neutrons.

In (group 1A)

Alkali metals	Atomic radius	Melting point	Boiling point
Lithium $_{3}^{7}Li$ (2, 1)	157 pm	181 ^{0}C	1347 ^{0}C
Sodium $_{11}^{23}Na$ (2, 8 , 1)	191 pm	98 ^{0}C	883 ^{0}C
Potassium $_{19}^{40}K$ (2, 8, 8, 1)	235 pm	64 ^{0}C	774 ^{0}C
	increases	decreases	decreases

-Atomic number increases from up to down which results in:

1- Increasing the atomic radius.

2- Decreasing melting and boiling point of alkali metals.

In group (7A) Halogen:-

Halogens	Atomic radius	Melting point	Boiling point
Chlorine $_{17}Cl$ (2 , 8 , 7)	99 pm	-110 ^{0}C	-34 ^{0}C
Bromine $_{35}Br$ (2, 8 , 18, 7)	114 pm	-7 ^{0}C	59 ^{0}C
Iodine $_{53}I$ (2 , 8, 18,18 ,7)	133 pm	114 ^{0}C	184 ^{0}C
	increases	increases	increases

-Atomic number increases from up to down which results in:

1-atomic radius increases

2-melting and boiling point increases

Note

The atomic radii of elements in the same group increase as the atomic number increase.

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Physical property	Melting point	Boiling point
solid	more than 25 ^{0}C	
liquid	Less than 25 ^{0}C	More than 25 ^{0}C
gas	Less than 25 ^{0}C	

Give reason:-

1-The melting and boiling points of lithium and potassium are higher than room temperature.

Because both are solid elements at room temperature.

2- The melting and boiling point of chlorine are lower than room temperature.

Because it is a gaseous element at room temperature.

Chemical activity

In alkali metals (group 1A) and alkali earth metals(group 7A).

Chemial activity increases from up to down by increasing atomic number.

- **Activity of alkali earth metal is less than alkali metal**
- **Cesium is the most active metal in the periodic table.**

In halogen (group 7A)

- **Chemical activity decreases from up to down by increasing atomic number.**
- **Fluorine is the most active nonmetal.**

In Inert or nobel gases (group18 or 0)

They are chemically inactive .does not share in chemical reactions.

Physical state of some halogen and alkali metals

Element	Physical state
Sodium	Solid
Potassium	Solid
Lithium	Solid
Chlorine	Gas
Bromine	Liquid
Iodine	Solid

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Worksheet (2)

Q. 1-Choose the correct answer:-

1-What is the name of the element that was named in the honor of Mendeleev?

a-Mendelevium (Md) b-Moselium (Ms)

c- Rutherfordium (RF) d-Mendelium (Me)

2-Who is credited with the first real attempt to classify the element?

a-Moseley b- Rutherford c-Mendeleev d-Einstein

3-How many horizontal periods are in the modern periodic table?

a-5 b-6 c-7 d-8

4-How many vertical groups are in the modern periodic table?

a- 12 b-15 c-16 d-18

5-Which of the following is solid element?

a- Helium b-neon c-carbon d- Oxygen

6- Which of the following is the only liquid metal?

a- Silver b- mercury c- bromine oxygen

7-How many electron do halogen have in their outermost energy level?

a-7 b-5 c-6 d-9

8-What is the valency of an element in group 3A?

a-1 b-3 c-4 d-5

9- Which period does transition metal start to appear?

a-3 b-4 c-5 d- 6

10-What is the common name of group (1A)

a- Alkali earth metal b- alkali metal

C -Transition element d- inert gases

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Q.2 Write the scientific term:-

1-The element found in the middle section of the periodic table between the S and P block. (……..)

2-The most active metal found in group 1A of the periodic table.

(……..……)

3- Elements combine in their properties between metals and non-metals

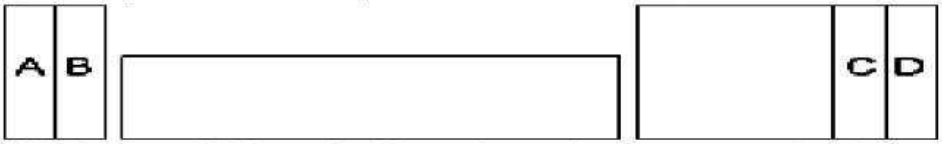
(……..)

4-Gases found at the last group and don't share in chemical reaction.

(…….....)

5- The property which Mendeleev depends on in his table. (..……)

Q.3 The following figure illustrates some groups of the periodic table :



Which of the following is correct about the elements in these groups ?

(a) Group (A) : Monovalent nonmetals.
(b) Group (B) : Their atomic radii decrease with increasing the atomic number.
(c) Group (C) : The physical states of its elements are not the same.
(d) Group (D) : Octavalent nonmetals.

Q.4 Give reason:-

1- Scientists have made many attempts to classify the elements.

……

……

2- Hydrogen is placed in group 1A.

……

……

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3-The melting and boiling point of alkali metals decreases as you move down the group.

.....

.....

4- Sodium and potassium have similar chemical properities.

.....

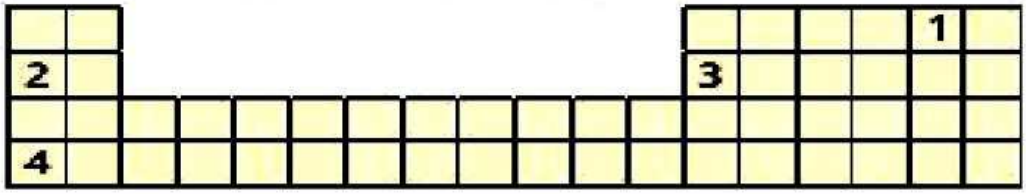
.....

5- Moseley's periodic table is based on atomic number rather than atomic masses.

.....

.....

Q.5) **section in the modern periodic table :**



(1) Which two elements are in the same period ?

(2) Which two elements are in the same group ?

Q.6 Locate each of the following element , then mention their types:-

1- Na_{11} .....

2- Ne_{10}.....

3-O_8.....

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LESSON (3) Matter and its properties

Substances are divided into:

1- Mixtures:

a- Homogeneous (solutions)

b- Heterogeneous (mixtures)

2- Pure substances:

a- Elements

b- Compounds

➢ **Mixtures:** are substances composed of two or more materials that are not chemically combined.

Mixtures can be separated by physical methods

- filtration
- evaporation and condensation.
- Magnetic separation

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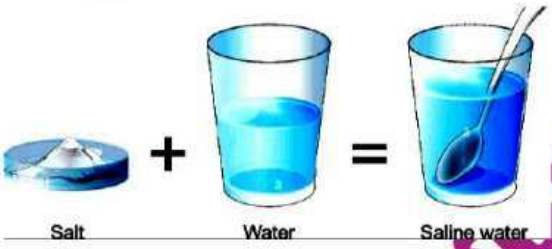
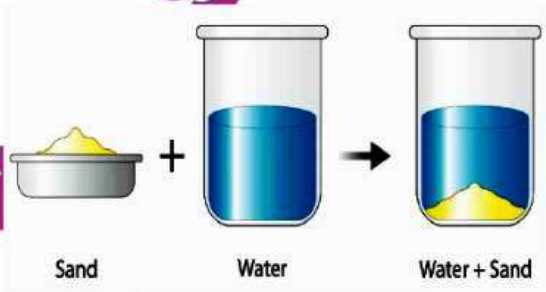
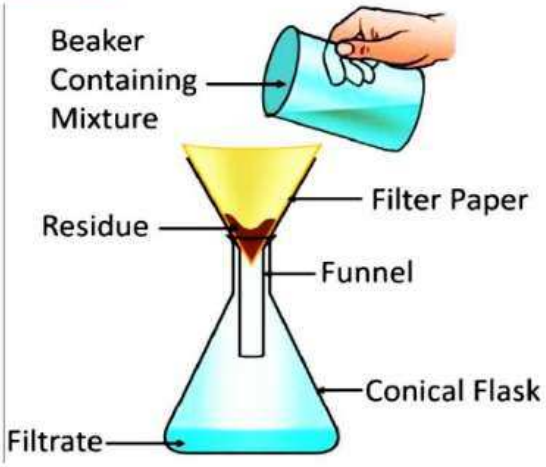
Mixtures are divided into

P.O.C	Homogeneous mixture	Heterogeneous mixture
Definition	Mixture cannot be distinguished with the naked eye.	Mixture can be distinguished with the naked eye.
Separation methods	Its components can be separated by **evaporation** and **condensation**.	Its components can be separated by **filtration**.
Examples	Mixture of table salt in Water.  **Table salt in water can be separated by:** **evaporation & condensation** They are method used to separate components of a solution of a solid substances which is dissolved in water. 	the mixture of Sand in water  **Sand in water can be separated by:** **Filtration** It is a method used to separate a solid substances which is not dissolved in water by using **filter paper** in a **filtration funnel.** 

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Remember All matter is composed of smaller units called molecules, which are composed of smaller units called atoms.

Pure substances:

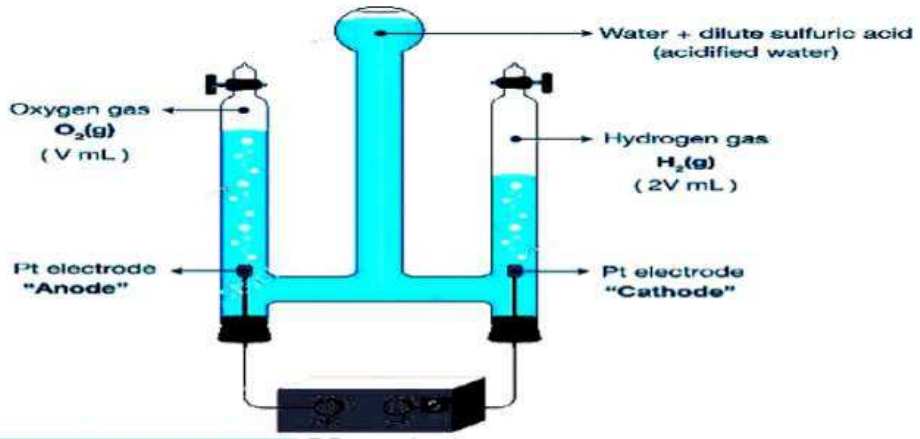
They are substance that cannot be separated by physical methods.

Pure substances are divided into:

Elements	Compounds
It is the simplest pure form of matter and cannot be dissociated into simpler forms, either by physical or chemical methods. **Examples:** 1-Mercury 2- Oxygen	✸They are formed by the chemical combination of two or more elements in fixed mass ratios. ✸They can be separated by chemical methods. **Examples :** 1-Water 2- Mercury oxide (red color) can be separated into (oxygen and mercury) by heating

The electrolysis separation of water

HOFMANN'S VOLTAMETER



Name : Hofmann's voltmeter

Usage : **Electrolysis water:** split water acidified with sulfuric acid into oxygen and hydrogen by using electricity)

Give reason: hydrogen is classified as an element.

➡Because it is the simplest pure form of matter and can't separate into simpler forms by using physical and chemical methods

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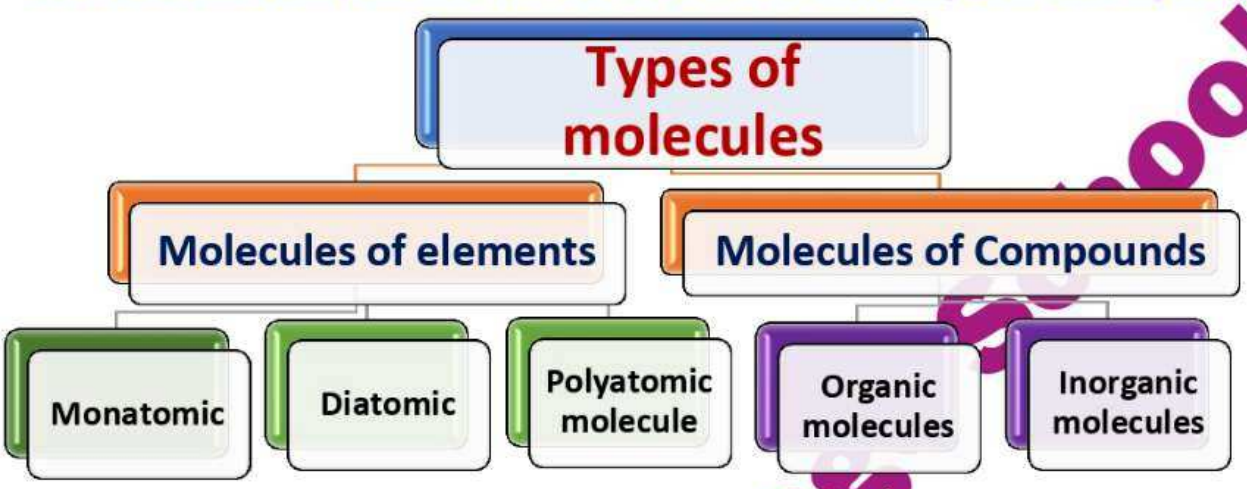
Give reason: water is classified as a compound .

➡ Because it is separated by electrolysis into oxygen and water.

Give reason: pure water is considered Pure compound.

➡Because the components can be separated into oxygen and hydrogen.



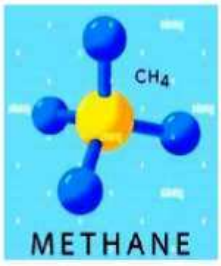
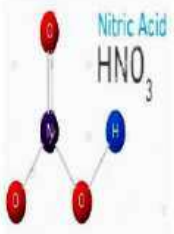
Molecules of elements:

Monatomic : consists of one atom as carbon (C)

Diatomic : consists of 2 atoms as Oxygen (O_2)

Polyatomic molecule : consists of more than two atoms as ozone (O_3)

Molecules of compounds:

P.O.C	Organic molecules (Carbon compounds)	Inorganic molecules
Definition	Chemical compounds in which carbon atoms bonded to hydrogen atoms and may also be bonded to other atoms as oxygen and nitrogen.	compounds which contains various, including carbon in some cases.
Examples	1- Methane contains C& H  2-Organic contains C,H,O 3- Organic contains C, H, N	5- Nitric acid 6- Carbon dioxide 

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	Methane molecule	Nitric acid molecule
Type of molecule	Organic compound molecule	Inorganic compound molecule
Molecular formula	CH_4	HNO_3
Number of elements in the molecule	Two elements: Carbon and hydrogen	Three elements: Hydrogen, nitrogen and oxygen
Number of atoms in the molecule	1C + 4H = 5 atoms	1H + 1N + 3O = 5 atoms

Give reason: Organic compound is called carbon compounds.

Due to the presence of carbon el ement the main component.

❖ What is a chemical formula ?

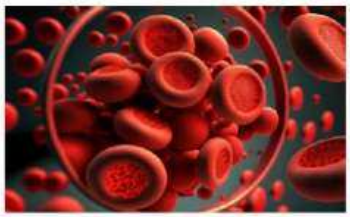
A combination of symbols and numbers that represent the number and types of elements (atoms) present in a compound like NH_3

Notes :

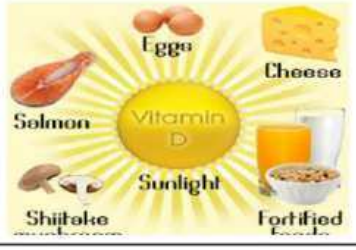
- ✓ **A chemical formula tells us the number of atoms of each element**
- ✓ **The number of atoms in one molecule in some compounds may reach several thousand like :**

Plastic polymers

Hemoglobin



Vitamin D



Vitamin D: regulates calcium and phosphorus levels to protect against osteoporosis.

❖ Life application :

-Indigo blue dye -Chemical formula: $CaCuS14O10$

- **Usage :**

✸The ancient Egyptians used it to color papyri and statues.

✸It is still used to color the facades of houses in Nubia villages.

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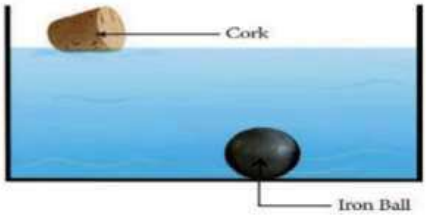
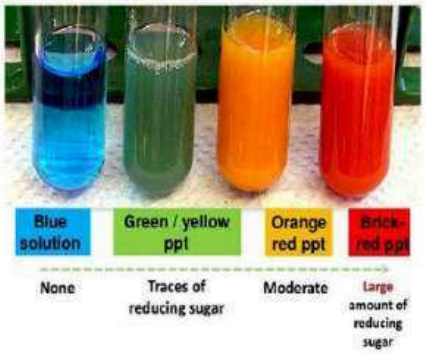
P.O.C	Physical properties	Chemical properties
Definition	They can be observed and measured in some cases.	They only appear when chemical reaction occurs causing a change in the shape and structure of substance.
Examples	1- The difference in density like that between cork and iron.  Iron ball sinks while cork floats in water 2- The difference in viscosity like that between honey and water. 3- The difference in the melting point on a block of butter and aerogel sheet 	1-The difference in color of litmus paper like in lemon juice from its color in toothpaste. 2- The difference in the color of th 3- e solid precipitate formed by adding a single reagent to two different solutions. 

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Substances	Properties	Uses	Illustrations
Helium	1- Inert gas 2- Less dense than air 3- Non- flammable	- It is used to fill balloons	
Nitrogen	1- Nonmetal gas 2- It doesn't affect by temperature changes 3- It doesn't react with rubber	-it is to fill car tires instead of air	
Silicon	1- Metalloid 2- It conducts electricity poor than metals but better than nonmetals	-It is used in the manufacture of electronic chips	
Stainless steel alloy	1- Made from iron with added elements 2- It is resistant to rusting	-It is used to manufacture cooking utensils	
Aluminum – titanium alloy	1- It is Lighter aluminum 2- It retains its strength at high temperatures	-It is used to in the construction of military aircraft frames / structure	

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TECHNOLOGICAL APPLICATIONS :

Name : Aerogel

Properties : it is transparent – low density solid materials – with high durability – it has excellent insulating properties

Uses : it is used in making jackets of researches in Antarctica instead of polar bear's fur

Give reason: **Aerogel is the lightest solid materials.**

Because air enters its composition by 99.8%, so it is low in density.

Density **is a physical property used to distinguish between materials that float on the surface of water and that sink in it.**

- **The material that has a density less than the density of water floats on its surface.**
- **The material that has a density greater than the density of water sinks in its surface.**
- **Density of cork is less than water.**
- **Density of iron is greater than water.**

Melting point **is a temperature at which the state of a Substance starts to change from solid to liquid.**

Butter block melts easily by heat, while the aerogel sheet is not affected even by a high elevation in temperature.

Viscosity **is a physical property of liquids that describes their resistance to flow and the movement of objects through them.**

- **Water has lower viscosity than honey so it is easier to stir water than honey**

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Worksheet (3)

Complete :

1- The components of a table salt solution can be separated by……..

2- ..... Examples of monoatomic molecules

3- The number of atoms in one molecule may reach several thousand, such as.....

4- Of the substances that float on the surface of water ……..

Give reason :

1- The vinegar solution is a homogeneous mixture

2- water is classified as a compound .

3- Celebration balloons and blimps are filled with helium gas

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Lesson (4) Chemical bonds

The molecules of substances around us are different.

Difference in the physical and properties of compound molecules.

Ex:

Compound	Sodium chloride (NaCl)	Hydrogen chloride (HCl)
Physical state	Solid	Gas
Ability to react with caustic soda solution	Doesn't react	React

Types of chemical bonds

1- Ionic bond. **2- Covalent bond**

1- Ionic bond:

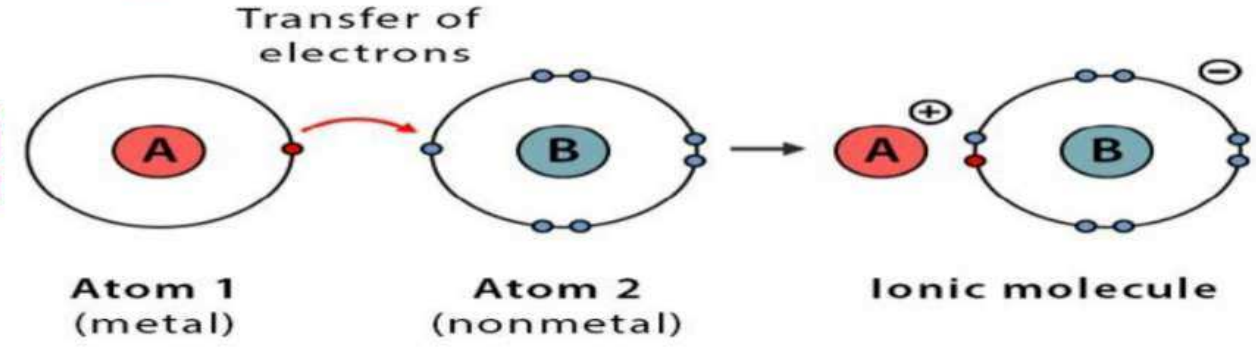
The electrostatic attraction between the cation (+ve ion) and the anion (-ve ion) forming ionic compound.

Note:

1-Ionic bond formed when metal react with non metal.

(the ionic compound is electrically neutral).

-Due to the equal number of positive and negative charge.



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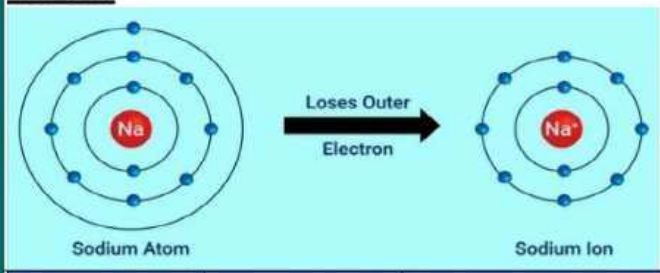
Role of metal and non metal in ionic bond:

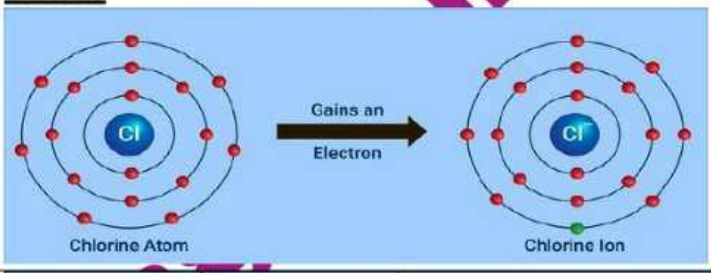
Metal	Non-metal
Lose its valence electron ↓ Forming Positive ion. (Cation)	Gain electrons ↓ Forming Negative ion (anion)
(+) Charge of cation = no.of lost electrons	(-) Charge of anion= no.of gained electrons .

Ex: Na



P.o.c	Na	Na^+ (cation)
No.of protons	11	11
No.of electrons	11	10
Electric charge	0 (no charge)	+1

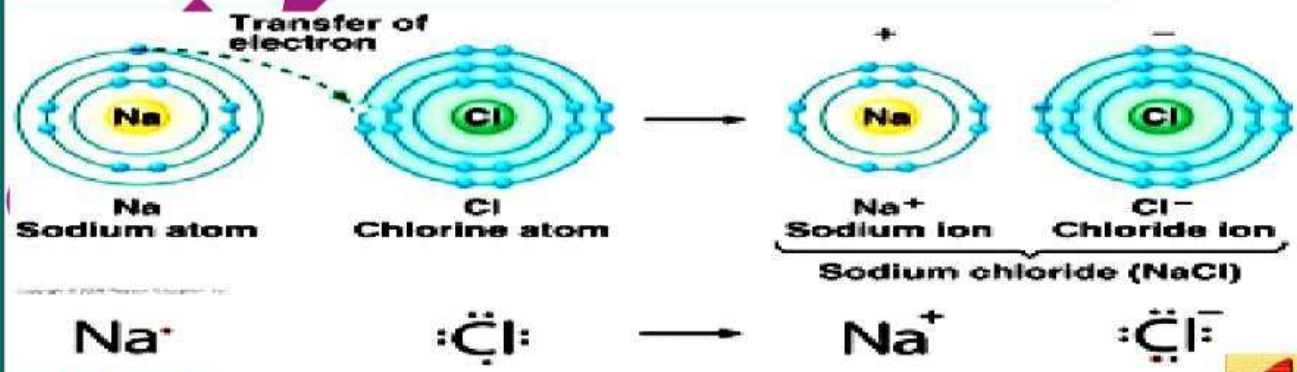
Ex : Cl



P.o.c	Cl	Cl^- (anion)
No.of protons	17	17
No.of electrons	17	18
Electric charge	0 (no charge)	-1

-**The electronic configuration of each of the cation and the anion is similar that of the nearest noble gas**

Ex: formation of ionic bond between sodium and chloride



$Na^{\cdot}$ $:\dot{\underset{\cdot\cdot}{Cl}}:$ ⟶ Na^+ $:\dot{\underset{\cdot\cdot}{Cl}}:^-$

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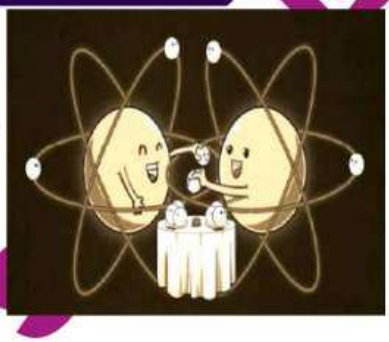
Molecular formula

-Formula which represents the number and type of atoms in a molecule.

How to write the molecular formula for ionic compound



1- Write the name of ionic compound

2- Write the symbol of each element in the compound.

3- Write the valence of each element below its symbol

4- Exchange the valence of them

Note:

- **Write the cation at left side then the anion at right side.**

Ex. Write the molecular formula for the following:

1- Magnesium oxide

Mg O

2. 2.

1 1

Molecular formula = MgO

2-Magnesium bromide

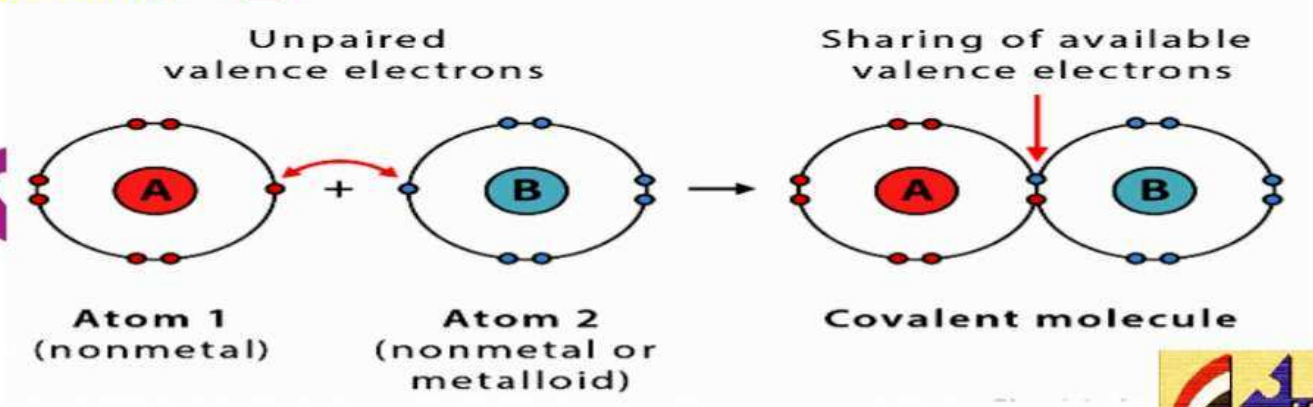
Mg Br

2. 1

Molecular formula= $MgBr_2$

2- Covalent bond:

Chemical bond formed due to sharing the valence electrons among non-metal elements.



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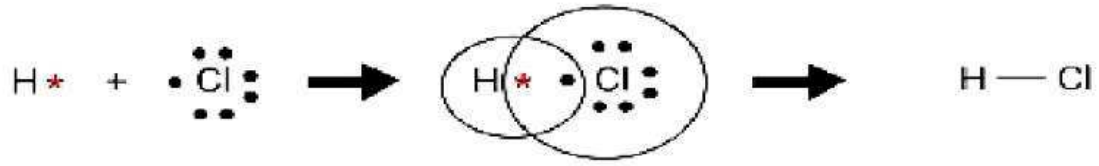
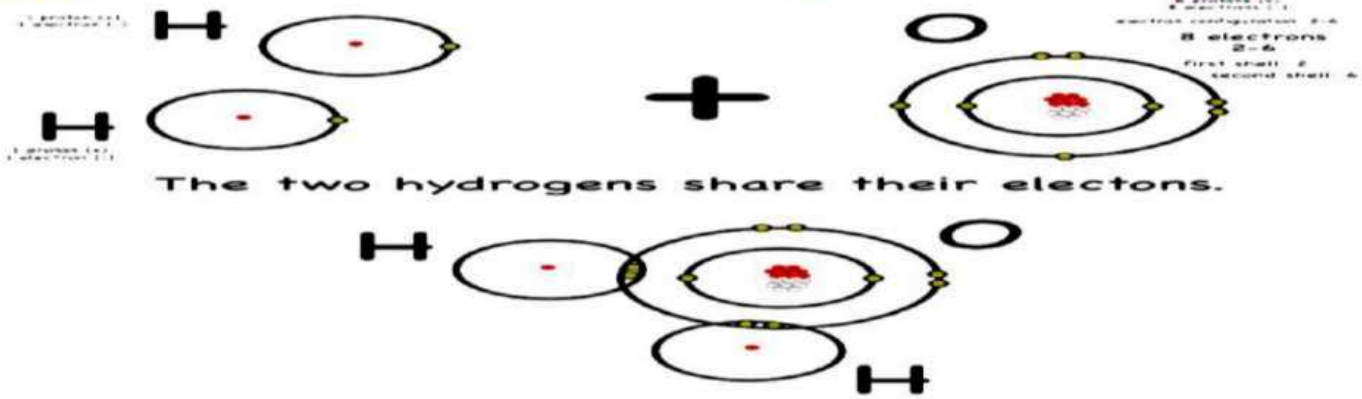


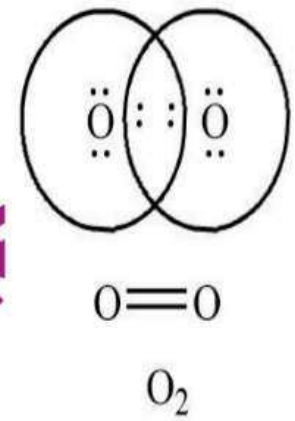
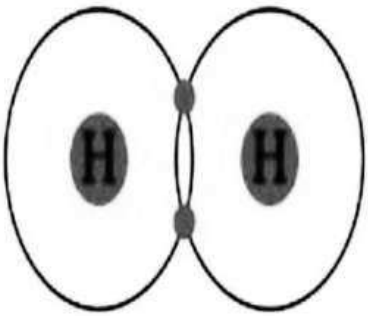
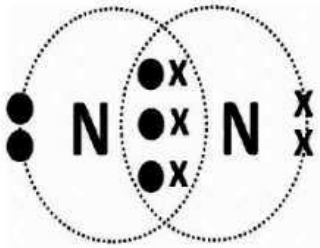
Ex. (1) : $H + Cl \longrightarrow HCl$

Ex.(2): $H + O + H \longrightarrow H_2O$



Chemical Formula: H_2O

Types of covalent bond:

Single	Double	Triple
———	═	≡
Ex. H_2	Ex. O_2	Ex. N_2
 $O=O$ O_2	 Single covalent bond (H—H)	 $N \equiv N$

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Difference between ionic compounds and covalent compounds

Ionic compounds	Covalent compounds
Dissolve in water	Don't dissolve in water
Conduct electricity	Don't conduct electricity
Have high melting and boiling point	Have low melting and boiling point.

Think

- Mention the type of bond in the following reaction?

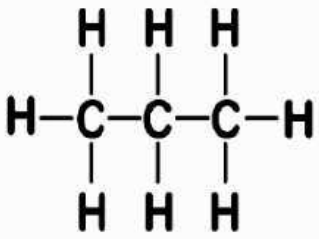
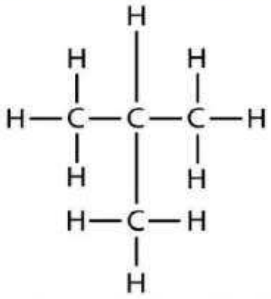
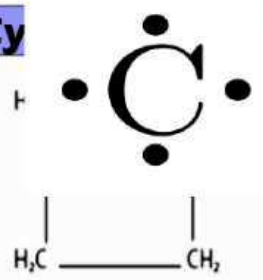
$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

Unique properties of carbon as the main element in organic compounds :

1- Outer most energy level of carbon contains 4 electrons.

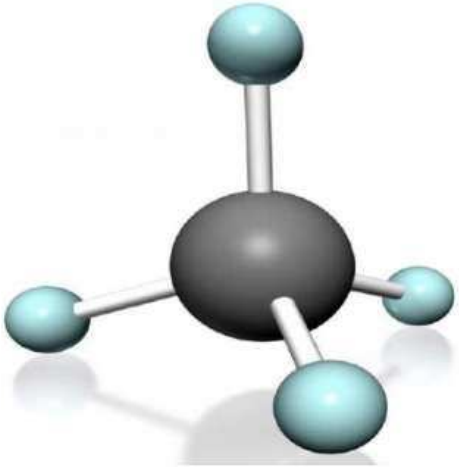
2- It has the ability to bind to each other in organic

Compounds as in the forms of :

Straight chain	Branched chain	Cy e
		

Example on the simplest organic molecule is

Methane



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Worksheet (4)

Question 1: choose the correct answer.

1-The atom charges to.....ion when it loses its outer electrons.

a) positive. b) negative. c) neutral

2- The of bond in sodium chloride molecule is.....bond

a) covalent. b) ionic. c) neutral

3- What is the molecular formula of the compound formed through the bonding of alkali metal A with an element B from group 6A?

a)AB. b) A_2B. c) AB_2

4- What is the number of electrons in Cl^- is ..... electrons

(The atomic number of Cl = 17)

a) 16 b) 17 c) 18

Question 2: write the scientific terms:

1- Electrostatic attraction between cation and anion. (.....)

2- Chemical bond formed due to sharing the valence electrons among non-metal elements (.....)

3- they are formed when a metal losses it's electrons (.....)

Question 3: Compare between covalent and ionic .

Question 4:

- Water and methane are two known compounds.

1) Which of them is an organic compounds?

2) Explain how the atoms bind together in the inorganic compound using Lewis structu

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Model answer

Worksheet (1)

Q.1) Write the scientific term:

1- matter. 2-atom 3-phosphorus 4-Mass number 5- electrons

6-protons 7-neutrons 8-no.of neutrons 9-isotopes

Q.2)Choose the correct answer :

1-b	2-a	3-b	4-c	5-b
6-c	7-b	8-a	9-d	10-b

Q.3)Write the symbols of the following :

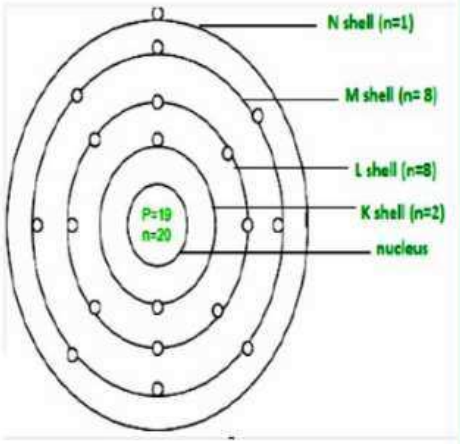
1-O 2-H 3-Fe 4-Si 5-c 6-Na

Q.4) c

Q.5) 1-No. of protons = no. of electrons = 2 + 8 + 3 = 13

Atomic no. = 13 Mass no. = 13+14 =27

2- a -No.of electrons = 39 -20 = 19 b- $^{39}_{19}Y$

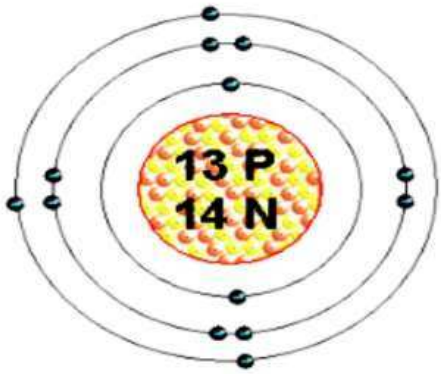


Q.6) Write the electronic configuration of the following:

1- no. of electrons = no. of protons = atomic no. = 19

Mass number =39

No.of neutrons = 39-19=20



2- no. of electrons = no. of protons= atonic no. = 13

Mass number=27

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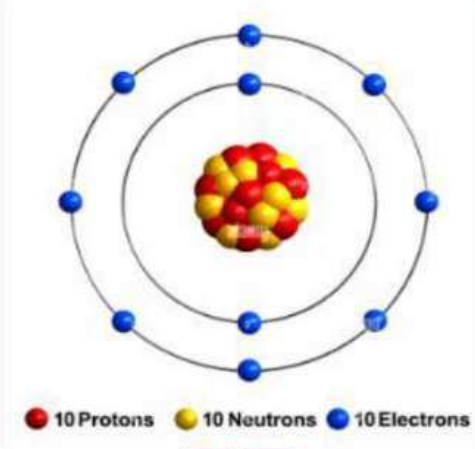
No. of neutrons = 27-13=14

3-no. of electrons = no. of protons= atonic no. = 10

Mass number=20

No. of neutrons = 20-10=10



Q.7) In the opposite figure:

The element	H	He	Li	Be	B
No.of protons	1	2	3	4	5
No.of neutrons	0	2	4	5	6
No.of electrons	1	2	3	4	5
The relation between protons and electrons	P = e	P = e	P = e	P = e	P = e
The relation between protons and neutrons	P > n	P = n	P < n	P < n	P < n

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Worksheet (2)

Q.1)

1- a 2-c 3-c 4-d 5-c 6-b 7-a 8-b 9-b 10-b

Q.2)

1-Transition element (d –block element) 2-cesium

3-metalloid 4- nobel (inert) gases 5- atomic mass

Q.3) (C)

Q.4)

1-facilitates their study and find a relationship between physical and chemical properties of elements.

2- Because it has only one electron in the outer most energy level.

3- Because they are similar in the electrons of the outer most energy levels

4- Because the properties of elements related to their *atomic number* not their atomic masses.

Q.5)

1- 2, 3 2- 2 ,4

Q.6)

1- Period (3)	group (1A)	Metal
2- Period (2)	group (0 or 18)	Nobel or inert gas
3- Period (2)	group (6A or 16)	Non metal

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Worksheet (3)

Complete:

1-Evaporation 2- Carbon 3-Vitamin D 4- Cork

Give reason :

1- Because its components cannot be distinguished with the naked eye
2-Because, it's separated by chemical methods
3-Because its density is less than air

Worksheet (4)

Question 1: choose the correct answer

1- a Positive	2- b Ionic	3- b A_2B	4- c 18

Question 2:

1- Ionic bond	2- covalent bond	3- cation (positive ion)

Question 3:

Ionic compounds	Covalent compounds
Dissolve in water	Don't Dissolve in water
Conduct electricity	Don't conduct electricity
Have high melting and boiling point	Have low melting and boiling point

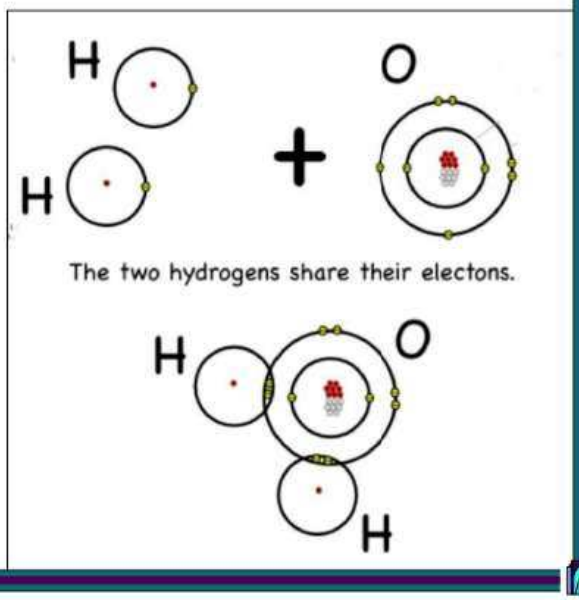
Question 4:

1- Organic compound is methane

2- Inorganic compound is water

it's molecules bond together by covalent bond

Lewis structure of water.



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Science Department

Prep. (1) Unit (2)

Force fields

Name :.....

Class:.....

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Unit (2) Lesson (1)

(Electric forces)

✓ **All materials are composed of electrically neutral atoms. (Give reason)**
Because the number of positive charges equals the number of negative charges in them.

Balance between (+) and (-) charges → **is disturbed** → **Form electricity (Static electricity)**

Static electricity = electrostatic

Methods of charging

- Friction (rubbing)
- Conduction

➢ 1- By Friction:

➢ **What happen if :**

1-Rub one end of an ebonite rod with a piece of wool , then bring the rod close to lightweight paper pieces (paper scraps) or small foam pieces ?

The paper scraps are attracted to the rod end

G.R

Because they have been charged with static electricity charges.

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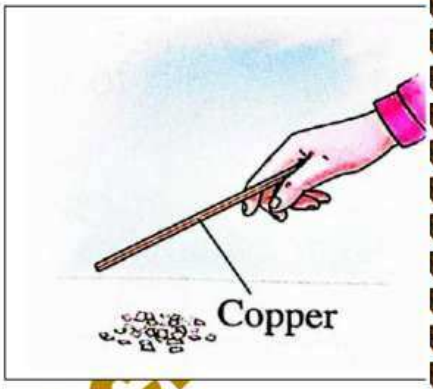
2-Rub one of end a copper rod with a piece of silk, then the rod is brought close to paper scrapes ?

The paper scraps are **not attracted** to the rod end.

G.R

Because copper doesn't give them the ability to attract lightweight objects. The charged part is insulated to prevent the leakage of electric charges.



✓ Give reason:

1-Feeling a slight electric shock when touching a metal door handle after walking barefoot on the carpet.

Because when touching the handle, the charge formed on the body is discharged as a result of the friction with the carpet.

2-Hearing a slight cracking sound when taking off woolen clothes in winter.

Because on the friction with the woolen clothes, the electric charges formed on the body are discharged .

Charging by friction (rubbing)	**The process of charging two uncharged objects by rubbing two objects together .**

1- When two different uncharged objects are rubbed together.

What happen :

When two different uncharged objects are rubbed together.

Electrons

transfer from

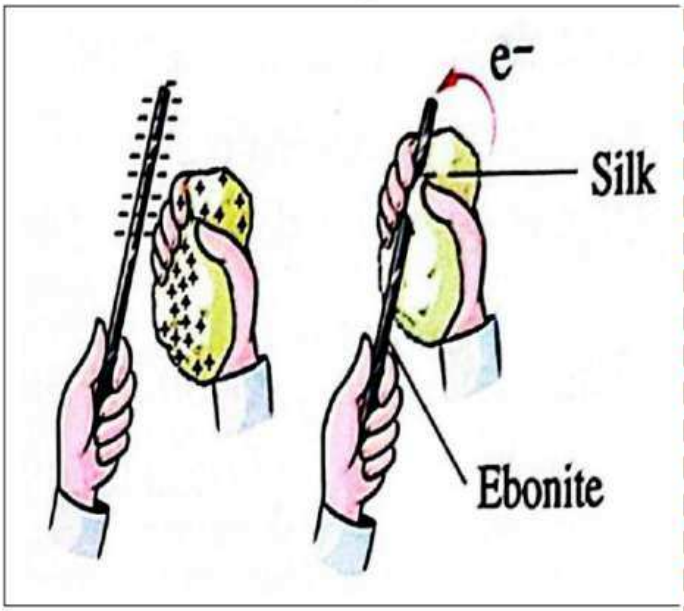
the atoms found on the surface of one object

To

The atoms found on the surface of the other object

Causing

Both to become electrically charged with equal magnitude of charge but opposite in type



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➢ The object that loses electrons ⟶ becomes positively charged.
Like (silk)

➢ The object that gains electrons ⟶ becomes negatively charged.
Like (ebonite rod)

Static electricity (Electrostatic charges)	• The charges that accumulate on the surfaces of objects when they lose or gain electrons
Coulomb meter device	• It is a device used to measure weak electricchanges and are measured in units of coulombs .

The scientist Charles – Augustin de coulomb

- A French physicist.
- He formulated the law describing electric forces between charged particles, named after him (Coulomb's law) , also known as the inverse – square law
- His studies and discoveries in the late 18th century laid the foundation for the development of electromagnetic theory.
- In his honor, the unit of electric charge (coulomb) was named after him.

2-The type of charge acquired by the rubbed object differs depending on the type of the rubbing material :

➢ According to the position of the two materials in the electrostatic series.

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Electrostatic series

The Electrostatic Series

- The arrangement of materials according to the easiness of losing electrons when rubbed together.

➢ **When one material is rubbed with:**

A material **higher** on the series (tends to **lose** e-) → It becomes **positively** charged

A material **lower** on the series (tends to **gain** e-) → It becomes **Negatively** charged

The objects that can be charged with static electricity can be made of :

P . O . C	(1) Electrically conducting materials	(2) Electrically Non-conducting materials (insulators)
Examples	**On the condition that:** the charged part in insulated to prevent the leakage of electric charges. **Examples:** • Carbon. • All metals , such as (copper , iron , Aluminum)	• Wood. • Paper. • Wool. • Silk. • Glass. • Ebonite.

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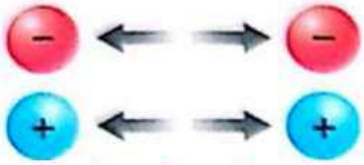
The Electric forces

Electric forces	• The electrically charged objects exert mutual forces on each other, which differ in type depending on the nature of the charges on the objects.

✓ What happen if :

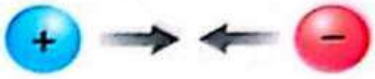
1-The objects have the same type of the electric charges.

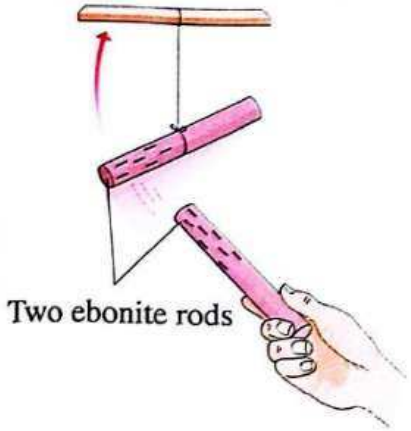
A repulsive electric force arises between them.



2-The objects with different the electric charges.

An attractive electric force arises between them .



Experiment	Result	Reason
1-Rub two ebonite rods with a piece of silk and hang one of them freely, then bring the other rod close to it. 	The free-moving rod moves away (repelled) from the fixed rod.	Rubbing the ebonite rods with silk gave Them the same negative charges , leading To the repulsion between them.

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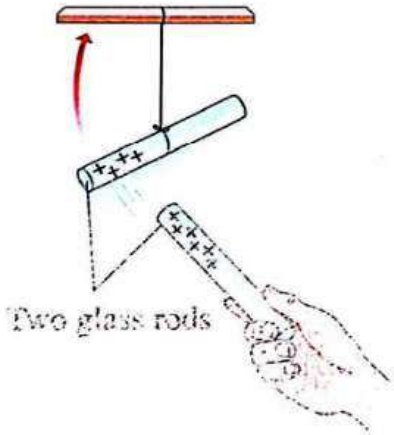
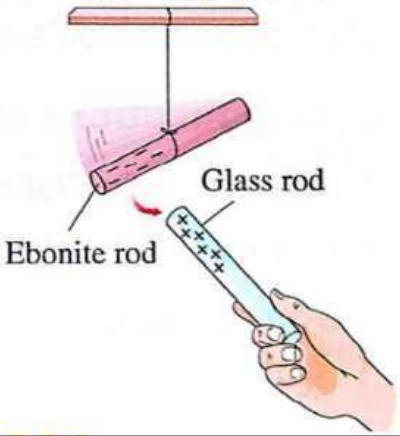
2-Rub two glass rods with a piece of silk and hang one of them freely , then bring the other rod close it  	**The free-moving rod moves away (repelled) from the fixed rod**	**Rubbing the glass rods with silk gave them the same positive charges , leading to the repulsion between them.**
3-Hang the ebonite rod after rubbing it with a piece of silk , then bring the glass rod , after rubbing it with silk , close to it .  	**The free-moving rod moves closer (attracted) to the fixed rod**	**The charge formed on the ebonite rod when rubbed with piece of silk is negative , while the charge formed on the glass rod when rubbed with the same piece of silk is positive , leading to the attraction between them.**

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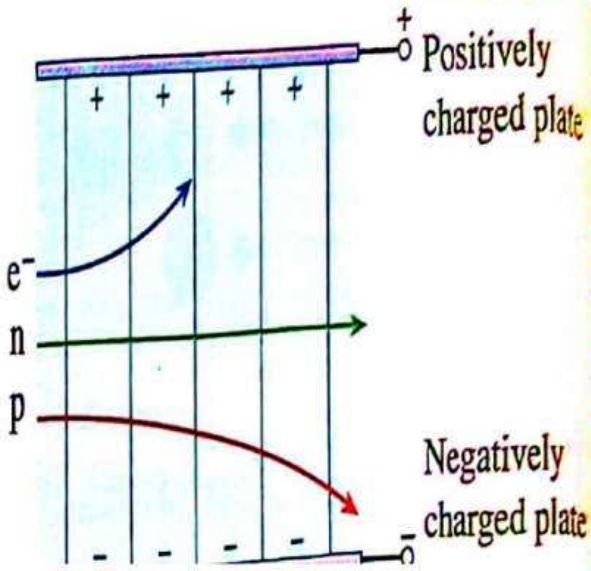
Predict the path of a beam of subatomic:

Particles:-

- **The electrons are deviated towards the Positive plate (G.R).**
  Because they are negatively charged and the different charges attract each other.

- **The neutrons pass in a straight line without deviation (G.R).**
  Because they are neutrally charged.

- **The protons are deviated towards the negative plate (G.R).**
  Because they are positively charged and the different charges attract each other.



❖ The Electrostatic plating:

- **Importance:** Metal plating .
- **Its working idea:**

1-The object to be plated is charged with a negative electric charge.

The paint spray is charged with a positive electric charge.

2- When sprayed , the paint particles are attracted to the object to be plated (G.R).

Due to the difference in their charges.

- **Advantages :-**

1-Ensures an even layer of point.

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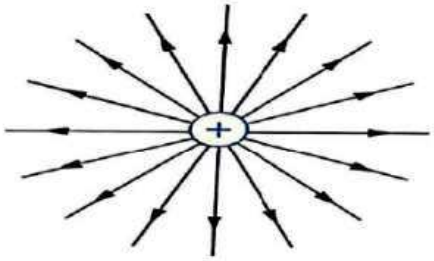
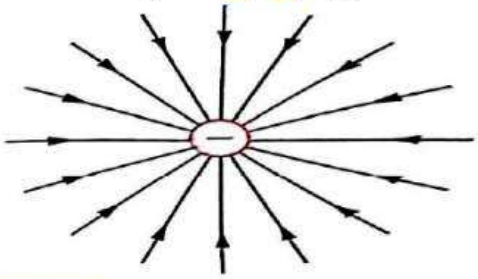
The Electric field

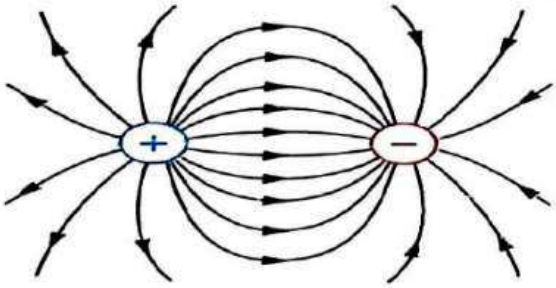
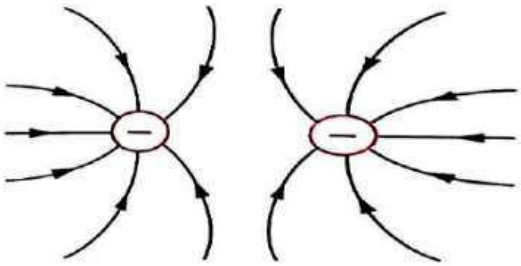
The Electric field	• **The region of space surrounding an electric charge in which its effect appears.**

Shapes of Electric force lines of the electric charges :-

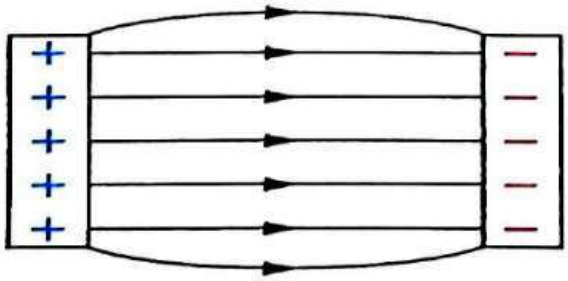
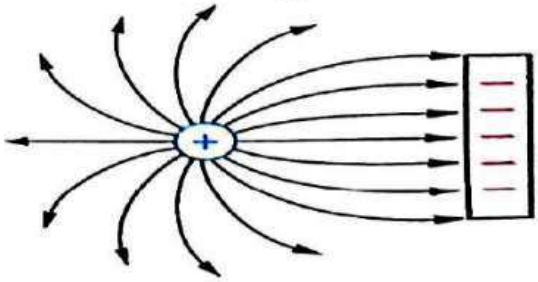
1-Electric force lines for a single charge

Positive charge	Negative charge
	

2-Electric force lines between two charges

Different charges	Similar charges
	

3-Electric force lines between

Two metal plates With different charges	A charged plate and an opposite charge
	

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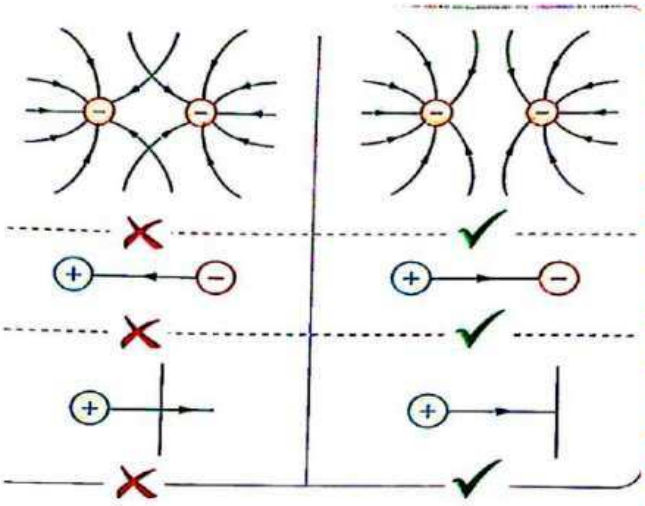
❖ Properties of electric force lines :-

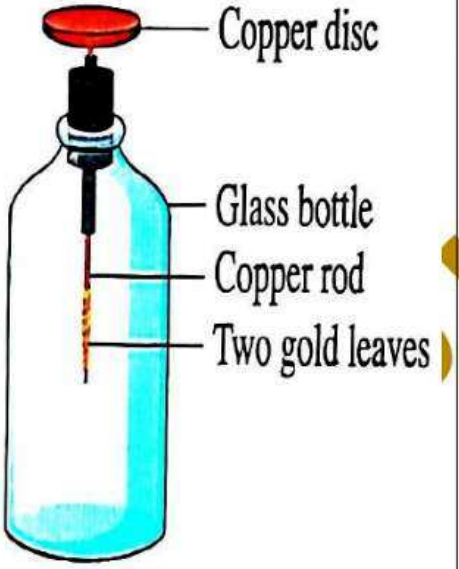
1-Imaginary lines that do not intersect each other.

2-They start from the positive charge and end at the negative charge .

3-They ends at the surfaces of charged metal objects and do not penetrate ther



The electroscope device



❖ **A device** electrically charged and the type of charge on them.

➢ **It's composition :**

-Copper disc / -Glass container

-Copper rod / -Two gold leaves

➢ **Its uses :-**

1-Delecting if an object is electrically charged.

2-Determining the type of charge on a charged object .

3-Comparing the magnitude of charges on different charged objects .

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To detect the electric state of an object

IF

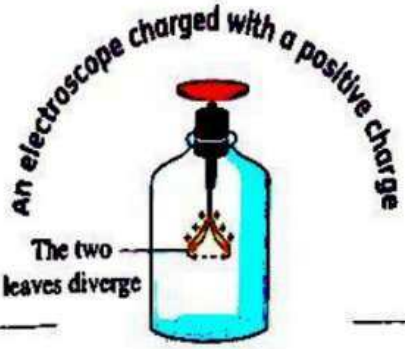
The leaves of the electroscope do not diverge (spread apart)

Then the tested object is not charged

The leaves of the electroscope diverge (spread apart)

Then the tested object is charged

Determining the type of charge on a charged object



IF

The gold leaves divergence increases

Then the charge of the tested object is the same as the electroscope charge (positive charge)

The gold leaves divergence decreases

Then the charge of the tested object is opposite to the electroscope charge (negative charge)

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✓ **The separation between the gold leaves of a positively charged electroscope decreases when an ebonite rod rubbed with wool is brought close to the electroscope disc. G.R**

Because the ebonite rod acquires a negative charge when rubbed with wool , and thus the divergence of the gold leaves decrease due to the difference in charge between the rod and the leaves .

Charging by contact	❖ The process of charging an uncharged object by its contact with a charged object .

Notes :-

1-In charging by contact:

- **The charged object touches the object to be charged without rubbing.**
- **The object to be charged acquires the same type of charge as the touching object.**

2-Attraction can occur between an uncharged object, as in the case of paper scrapes (uncharged) being attracted to a comb (after being rubbed).

1-Fuel transport vehicles have metal chain that dangle to touch be ground.G.R

To discharge the electric charges generated by friction of the fuel with the surface of the fuel tank, to prevent fuel combustion .

2- Lightning rod	❖ **It's composition :** A metal rod ✓ **The lower end:** fixed in a plate buried in the ground . ✓ **The upper end:** Pointed , allowing accumulated electric charges from nearby clouds to pass through it to be ground without causing any damage to the building . ❖ **It's Importance :-** A system used to protect structures and building from lightning strikes .

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Worksheet on lesson (1)

Q.1) Write the scientific term :-

1-The process of charging two uncharged objects by rubbing them together.
(.....)

2-The region of space around an electric charge , in which its effect appears.
(.....)

3-The measuring unit of electric charge. (.....)

Q.2)Choose the correct answer :-

1-Among the electrical conductors is .....

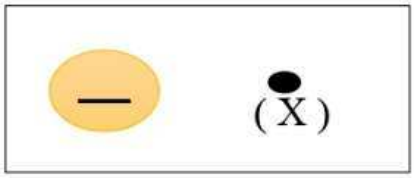
a-a glass rod b-a wooden ruler c-a plastic straw d-a metal nail

2-When a rod is rubbed with a piece of cloth, it acquires a negative electric charge , which of the following explains how the electric charges transferred between them?

ⓐ ⓑ ⓒ ⓓ

3-The opposite figure shows point (X) located near a negatively charged ball .

Which of the following expresses the direction of the electric field at point (X) ?



a-	b-	c-	d-
↑	↓	→	←

Q.3)Mention one importance for each of the following :

1-Electroscope.

.....

2-Electrosraric plating.

.....

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Q.4) What is meant by ?

1-Electrostatic series:……

……

Q.5) Give reason ?

1-The attraction of paper pieces to an ebonite rod rubbed with wool ?

……

2-Touching the electroscope disc with the hand before using it ?

……

Q.6)What are the results based on :

1-Rubbing a wooden rod with a piece of cotton ?

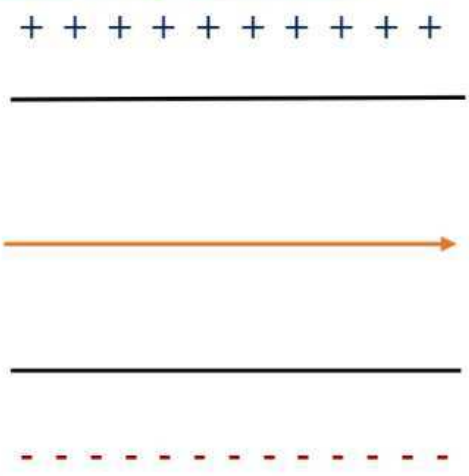
……

2-Rubbing two different insulated uncharged objects together ?

……

Q.7)Study the following figures , then answer the question :-

The opposite figure shows the particle (X) passing between two plates in an electric field .



1) Identify the type of electric charge carried by particle (X) ……..

2) Choose: the charge of particle (X) is similar to that of the …….

(electron – neutron – proton)

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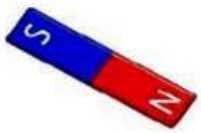
Lesson (2)

There are two types of magnet :

- **Natural magnet (lodestone)**
  - It has the ability to attract metallic objects.
- **Artificial magnet**



Bar Magnet

Ring Magnet

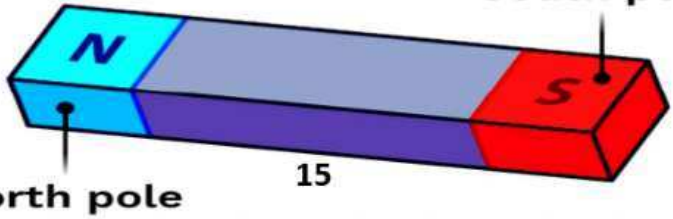
Horseshoe Magnet

Disc Magnet

Magnetic Needle

Magnet has two poles

- **North pole (N)**
  - takes red color
- **South pole (S)**
  - takes blue color



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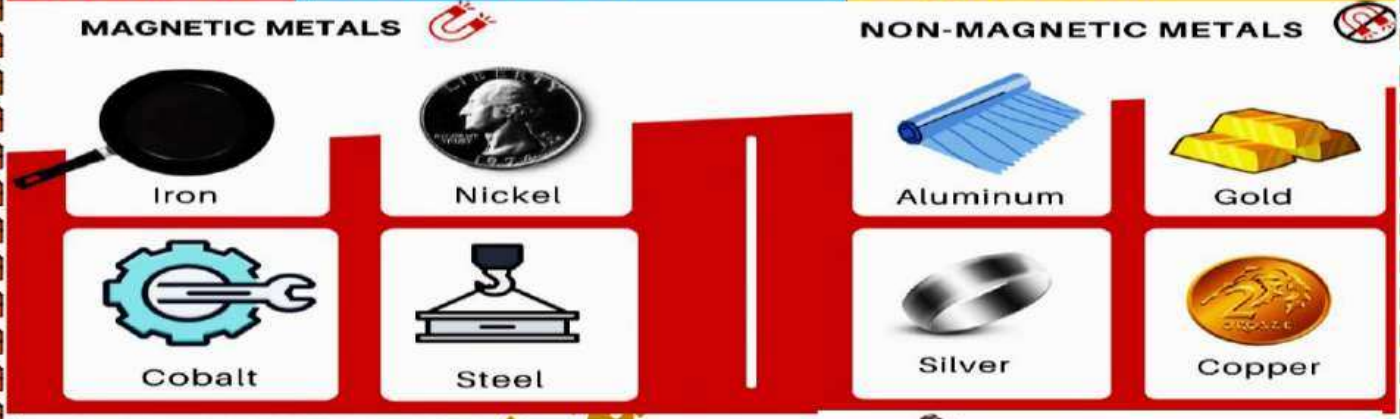
Note:

✸It is impossible to obtain a single (an isolated) magnetic pole solely.

✸Metallic materials are classified according to their attraction to magnets into: 1- Magnetic materials 2- Non-magnetic materials

P.O.C	Magnetic materials	Non-magnetic materials
Definition	These are materials that attracted to magnets.	These are materials that are not attracted to magnets.
Examples	1-Steel 2- Cobalt 3-Iron. 4-Nickel.	Gold - Aluminum - Copper- Silver



❖ LIFE APPLICATION:

Name : Magnetic brush and iron.

Usage: Forensic and criminal investigation experts, filings in criminal Investigations to reveal the unclear fingerprints.

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The procedure:

1. The magnetic brush is brought close to The iron flings, which are attracted to it.
2. The brush is then passed over surfaces Where the unclear fingerprints are present.
2. Some iron filings stick to the traces left by the fingerprints, which making them visible.

Properties of Magnets:

1-The attraction force (magnetic forces) of a magnet: it is strongest at its poles, and it decreases as it gets closer to the middle of the magnet.

What happens: A bar magnet is dipped into iron fillings.

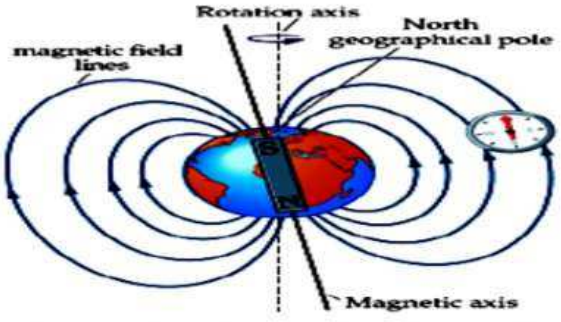
-Iron filings are attracted to the magnet, with the highest density of filings at the poles of the magnet, and the density of the filings decreases at the middle of the magnet.

2-A magnet always takes a certain direction: when it is suspended freely, influenced by the earth gravty.

-The earth acts as a giant magnet, where

The magnetic south pole (S) of the earth is ⟹ The geographical North pole of the earth .

The magnetic north pole (N) of the earth is ⟹ The geographical South pole of the earth



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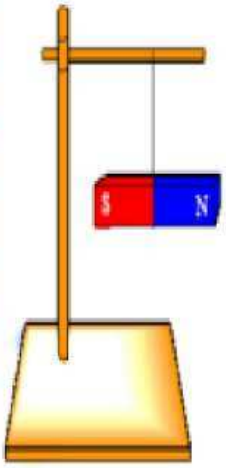
A magnet is suspended freely (it always takes a certain direction) where:

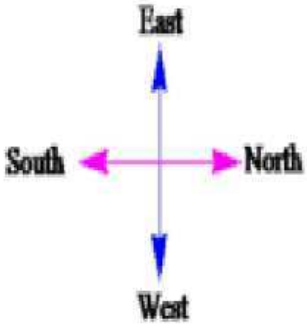
The North Pole (N)

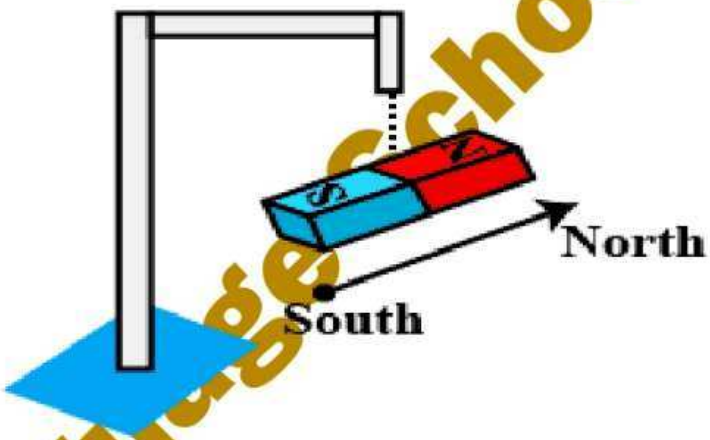
of the freely Suspended magnet → **points towards** → **The geographical north pole of the earth .**

The South Pole (S)

of the freely Suspended magnet. → **points towards** → **The geographical south pole of the earth.**







• LIFE APPLICATION :

Name: The Compass.

Structure: ✱A free-moving magnetic needle fixed at its pivot.

✱Placed inside a copper or plastic box

Give reason: the compass isn't made of iron.

To prevent the attraction between the needle and the box material.

Importance:

The compass is an old tool used to determine the Earth's four main geographical directions.

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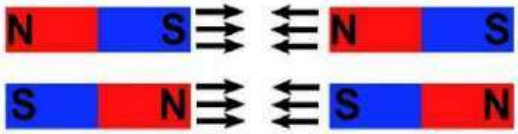
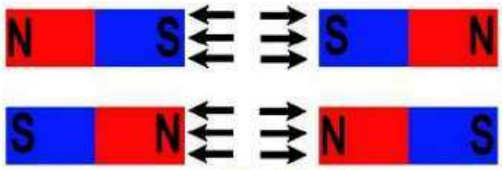
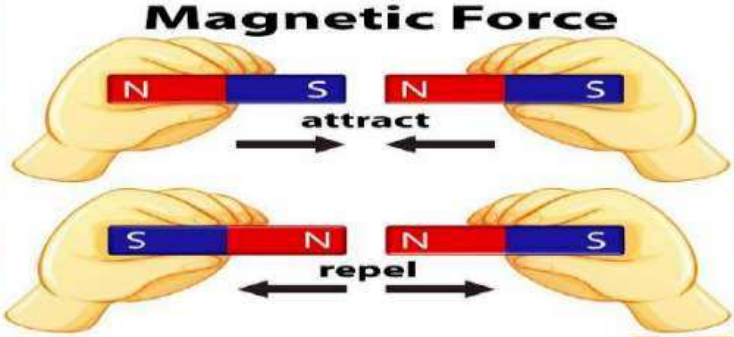
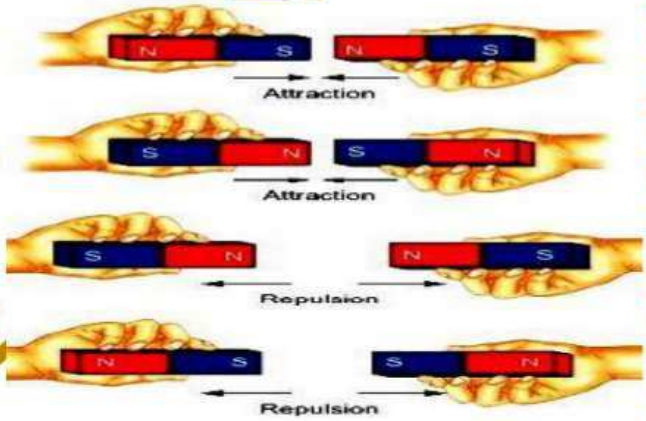
The Law of attraction :

Similar magnetic poles repel each other.	Different magnetic poles attract each other.
ATTRACTION 	REPULSION 





What happen if :

1-Two different poles of magnets are brought together.
They will attract to each other

2-✸A south pole of a magnet is brought close to south pole of another magnet.
✸A north pole of a magnet is brought close to north pole of another magnet.
The poles of the two magnets repel each other

Magnetic Field:

Magnet affects magnetic materials placed in it at a distance called (magnetic field) by a magnetic force.

- **MAGNETIC FIELD LINES : -**

They are imaginary lines that represent the force of the magnetic field.

- **THE MAGNETIC FIELD :-**

The region of space around a magnet where the effect of its magnetic force appears in it.

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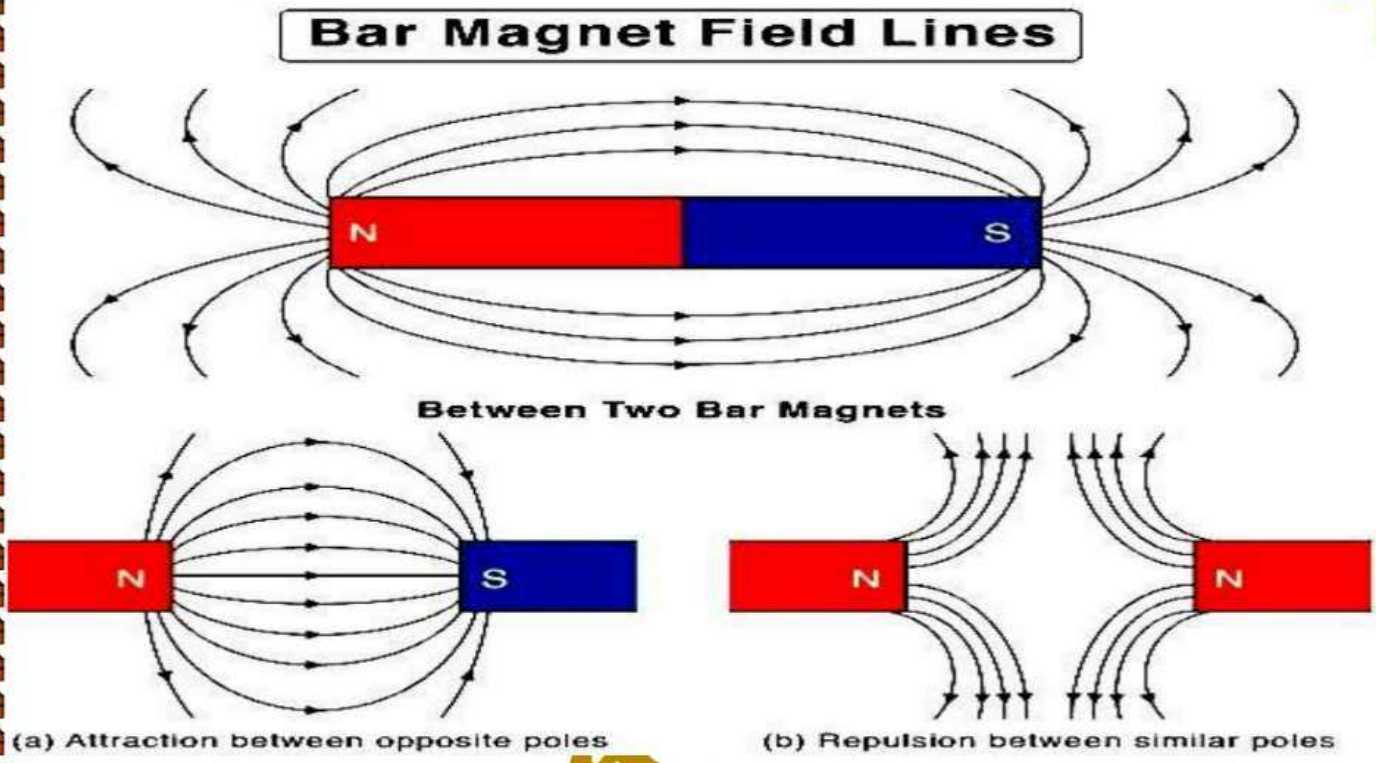
Shapes of Magnetic Field Lines :

1- Magnetic field lines of a magnet.

2- (a) Magnetic field lines between two different poles of two magnets .



3-(b) Magnetic field lines between two similar poles of two magnets.

➢ PROPERTIES OF MAGNETIC FIELD LINES :

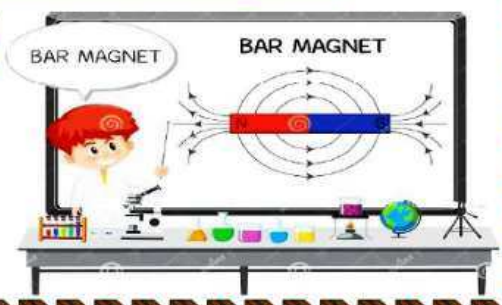
1- Imaginary lines that do not intersect each other.

2- They start from the north pole of the magnet and end at the south pole.

3- They are denser near the poles and far separated as they move away from them.

Focus :

The force between any two magnets can either be an attractive force or a repulsive force, while the force between a magnet and the magnetic materials in its field is always an attractive force.



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Worksheet on lesson (2)

Q.1 Write the scientific term of each of the following statements:

(1) A natural rock that has the ability to attract objects made of iron.

(2) Materials that are attracted to a magnet.

(3) Materials that are not attracted to a magnet.

(4) An old tool used to determine the four main geographical directions of the Earth.

(5) The region of space around a magnet where the effect of its magnetic force appears in it.

(6) Imaginary lines that represent the force of the magnetic field.

Q.2 Complete the following sentences:

(1) The north pole of a magnet is symbolized by the letter .....while the south pole is symbolized by the letter.....

(2) When two positive charges are brought close to each other, a force of..... arises between them, while when the north pole of one magnet is brought close to the south pole of another magnet,..... occurs

(3) An..... Force arises between the north pole of a magnet and the south pole of another magnet, while a.....force arises between the south pole of a magnet and the south pole of another magnet.

(4) Magnetic field lines start from the.....pole and end at the..... pole.

Q.3: What is the similarity between a positive electric charge and the north pole of a magnet?

Q.4: What is the difference and the similarity between the north pole of a magnet and its south pole?

Give reasons of each of the following:

(1) Both iron and steel are magnetic materials.

(2) Copper and gold are non-magnetic materials.

(3) Electric field lines and magnetic field lines are similar in some properties.

(4) A moving magnet below a glass plate can move the pins placed on it

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Lesson (3)

Gravitational forces

Types of forces

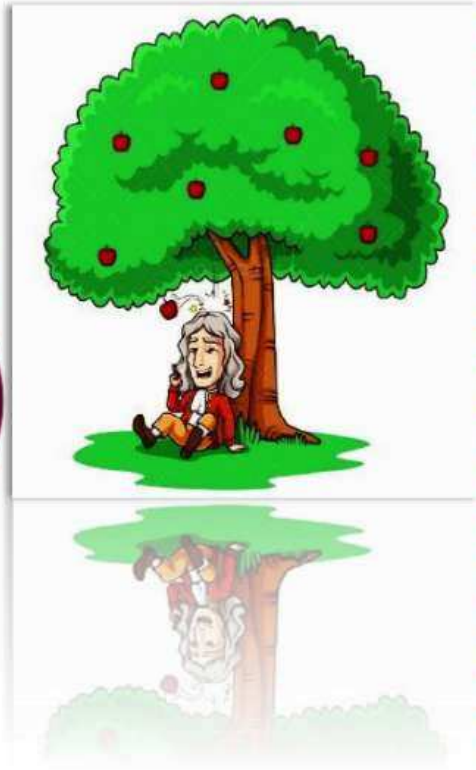
Field forces	Contact forces
Force that act on objects over a certain distance without touching.	Force that act on objects when they touch each other.
Have field	Don't have field
Such as: 1-Electrostatic forces. 2-Gravitational forces. 3-Magnetic forces.	Such as: 1- Collision forces. 2- Friction forces. 3- Elasticity forces.

Gravitational force:

Isaac Newton:

1- Discovered that all material objects in the universe attract each other.

2- In recognition Of his scientific contribution the unit force (Newton) was named after him.



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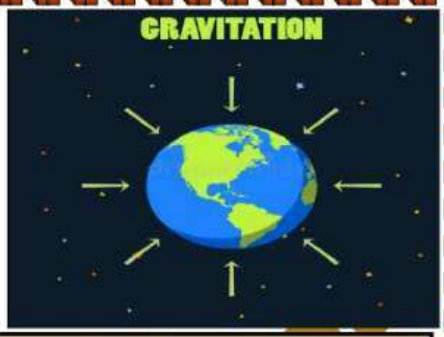
Earth's gravitational force:



The force that pull all objects down towards the center of the earth.

Earth's gravitational field:

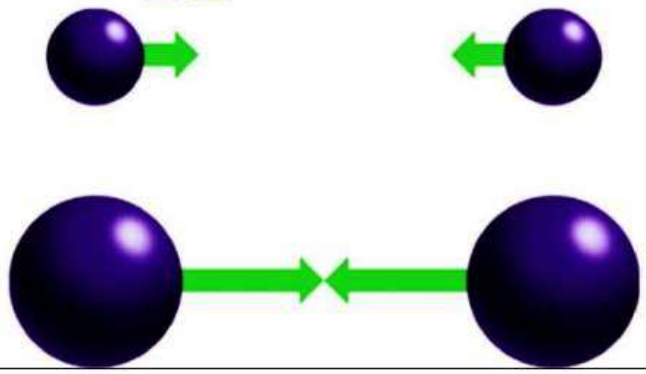
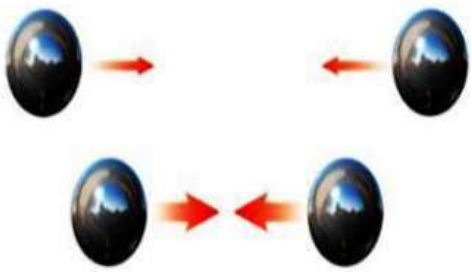
The space in which the earth's gravitational force affects material objects, with an attraction force towards the center of the earth.

Earth's gravitational lines :

Lines that represent earth's gravitational force.

Mutual gravitational attraction forces between two objects:

The mutual attraction force between two object depends on:

1- Masses of two objects	2- Distance between two objects
Gravitational force **increases** when the masses of two objects **increase.**	Gravitational force **decreases** as the distance between the centre of two objects **increases**.
	

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Note:

Gravitational force is a mutual force between two objects acting on each other of the two objects by equal magnetude but in opposite directions.

Impact of gravitational force:

Gravitational force is a weak force but it's effects are extremely important as it is responsible for:

1- The stability of the objects, rainfall and all the objects falling on the earth.
2- Tidal phenomenon (occurrence of tides).
3- Black holes phenomenon.
4- Orbital motion.

The role of gravity in the phenomenon of tides:

Tidal phenomenon (Tides):

It is a natural phenomenon that occurs due to the gravitational attraction forces between the moon and earth, causing periodic changes in elevation and recession of water in the seas and oceans.

Characteristics of tides:

1- Occur periodically and regularly (twice daily) (once every 12 hours).
2- Tides are at their peak when the moon is either new moon or full moon.

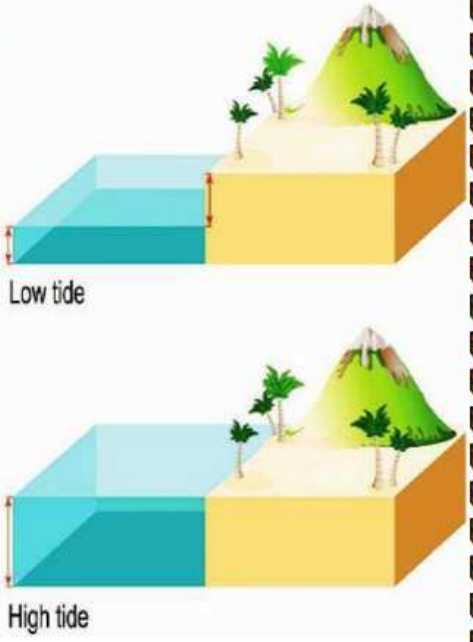
Importance of tides :

1- Used to generate electricity
2- Used to cleanse water bodies from impurities.

Note

*Tidal phenomenon is most noticeable in the Bay of Fundy in Canada

Where the difference between elevation and recession of water reaches (19 m)



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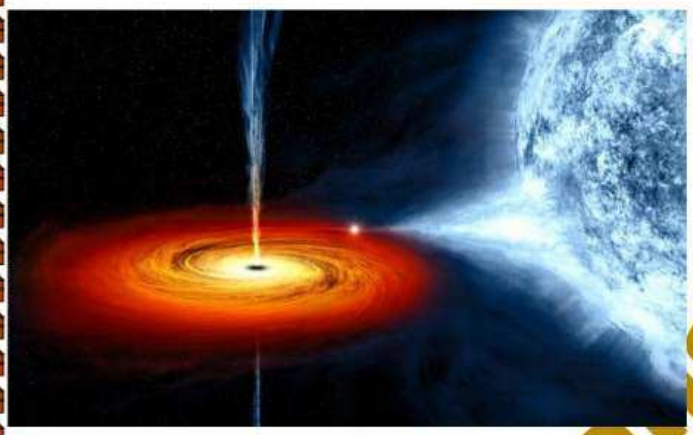
The role of gravity in black holes :

Black holes :

Regions in space formed due to the collapse of a massive star at the end of its life.

Note:

Black holes with immense gravity, so that even light can't escape from them.



The role of gravity in orbital motion:

Orbital motion :

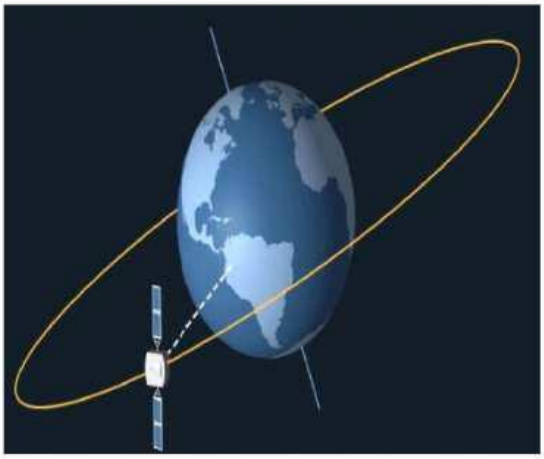
The rotation of any object around another central body in curved path due to the gravitational force between them.

Examples:

1- Motion of earth around the sun.

2- Motion of moon around the earth.

3- Motion of satellites around the earth.



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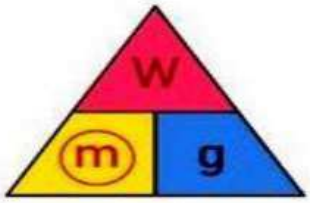
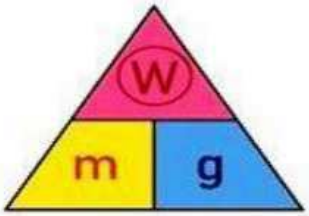
The relation between weight and gravity:

* **Mass differs from weight.**

P.o.c	Mass (M)	Weight (W)
Definition	The amount of matter the object contains.	The gravitational force that the object contain
Measuring unit	Kilogram (Kg)	Newton (N)
Measured by	Balance	Spring balance
Mathematical law	 m = W/g	 W = mg
Change in magnetude with changing object's position.	Give reason: Its magnetude doesn't change with changing object's position (Remains constant) -Because the mass of object is the amount of matter it contains.	Give reason: Its magnetude changes With changing body's position from one place to another. -Due to difference in the gravitational field intensity acting on it.

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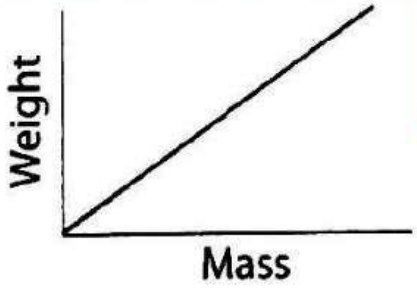
Note:

*The **weight** of an object increases as it's **mass** increases .



Problems

1- Calculate the weight of an object whose mass=50 Kg on earth's surface. (Earth's gravitational field intensity=10 N/Kg)

W= M× g
W= 50× 10= 500 N.

2- Calculate the mass of an object it's weight=245N on the earth's surface . (Earth's gravitational field intensity=10 N/Kg)

M=.....÷.....=.....÷.....=.....Kg

What is meant by....?

Earth's gravitational field intensity is approximately=10N/Kg

-This mean that every mass of 1Kg on earth's surface is attracted towards its centre with a force approximately=10N

The relation between the weight of an object and the gravitational field intensity acting on it:

Give reason

The earth's gravitational pull on objects is greater than the moon's gravitational pull on them.

-Because the gravitational field intensity of the moon is (1/6) that of the earth's gravitational field intensity.

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The earth's gravitational field intensity:

1- *Decreases* when the body moves away from the earth (Upwards from the earth). (By ascending above the earth's surface).

2- *Increases* when the body moves closer (downward to the earth) (descending towards the earth's surface).

Note:

1- The weight of an object in other space becomes zero. *Give reason*

Because there is no gravity in outer space

2- The weight of an object charges from one planet to another. G.R?

Because the gravitational field intensity change from planet to another.

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Worksheet on lesson (3)

Q.1 Question 1: put (✓) or (×) next each of the following statements that describe the earth's gravity.

1-Force that acts at a distance ( )
2-It affects at the mass of the objects ( )
3-It causes objects to fall towards earth's centre ( )
4-It's intensity decreases with increasing the distance from earth's centre. ( )

Question (2): Gve reason.

1- The rainfall and the falling of objects towards the earth.

2-The formation of black holes in space.

Question (3): what is meant by?

1-Contact force:……..
2-Orbital motion: ……..

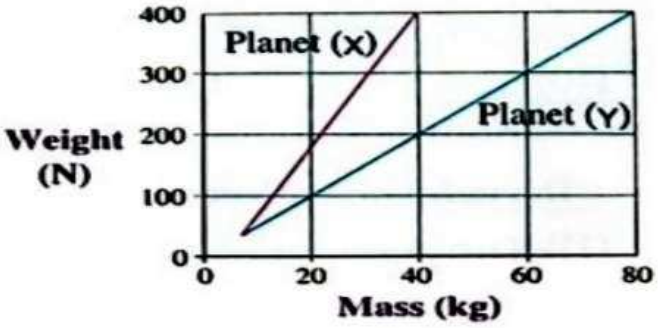
Question (4):

An object has a mass=60Kg on the moon calculate the weight on,
1) Earth's surface
2) The moon surface

(Knowing that earth's gravitational field intensity is 10 N/Kg).

Question (5):

Opposite graph shows the relation between weight and mass for several different objects on the surface of two plants.



Which planet has lower gravitational field……. Explain?

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Model answer
(lesson 1)

Q.1) Write the scientific term :-

1-Friction	2-Electric field	3-Colomb

Q.2) Choose the correct answer :-

1-d	2-b	3-d

Q.3) Mention one importance for each of the following :

1-Used to detect if an object is charged or not and determine the type of charge on the charged object.

2-Used to coat metals with a uniform layer without wasting paint material.

Q.4)What is meant by :

1-The arrangement of materials according to the easiness of losing electrons when rubbed together.

Q.5) Give reason:

1-Because the rod gains electrostatic charges , giving it the ability to attract lightweight objects

2-To ensure it has no electrical charge .

Q.6) What are the results based on :

1-Cotton gains a negative charge , while wood gains a positive charge .

2-Only the rubbed part of each object gains electrostatic charges .

Q.7) Study the following figures , then answer the question :-

1-Particle (X) is electrically neutral .

2-Neutron .

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Lesson (2)

Q.1 Write the scientific term of each of the following statements:

1- Magnetic rock

2- magnetic materials

3- non- magnetic materials

4- compass

5-the magnetic field

6- magnetic field lines

Q.2 Complete the following sentences :

1- N /S

2-repulsion /attraction

3- attraction / repulsion

4 -North / south

Q.3:

Similarity: the attraction force is the greatest in both of them.

Difference: magnetic field lines start from north and end from south

Q4: field lines start from each of them.

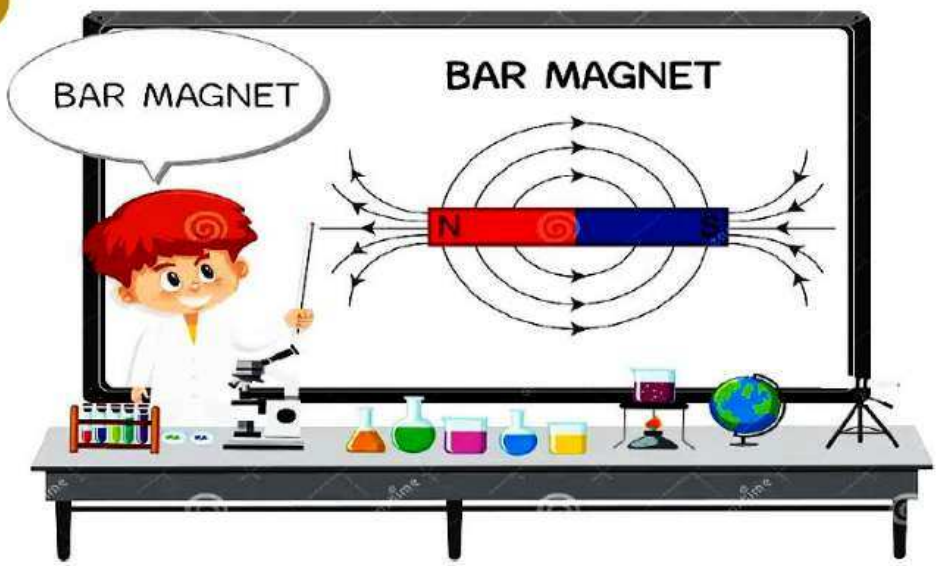
Q.5 Give reasons of each of the following:

1-Because they are attracted to magnet.

2- Because they aren't attracted to magnet.

3-Because both of them imaginary lines and don't intersect each other.

4-Because of the magnetic field.



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lesson (3)

Question (1):

1- ✓	2-×	3-✓	4-✓

Question 2: Give reason.

1- due to the earth's gravity.

2- due to collapse of massive star at the end of its life.

Question (3): What is meant by?

1- Contact force: force that act on objects when they touch each other.

2- Orbital motion: the rotation of any object around another central body in curved path due to the gravitational force between them.

Question (4): problems.

(1) Object's weight on Earth's surface (w)

= Object mass (m) x Gravitational field intensity (g)

= 60 × 10 = 600N

(2) The Moon's gravitational field intensity=(1/6) earth's gravitational field intensity.

So , the object weight on the moon (W)=(1/6) × object's weight on earth's surface.

600×(1/6)=100N

Question (5): graph.

The planet (Y) /Because the mass of an object remains constant regardless of the planet, but the weight decreases as the gravitational field intensity decreases (so the weight of an object mass is 40 g on the surface of planet (Y) is less than its weight on the surface of planet (X).

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Science Department

Prep. (1)

Unit (3 and 4)

First term

Name :.....

Class: .....

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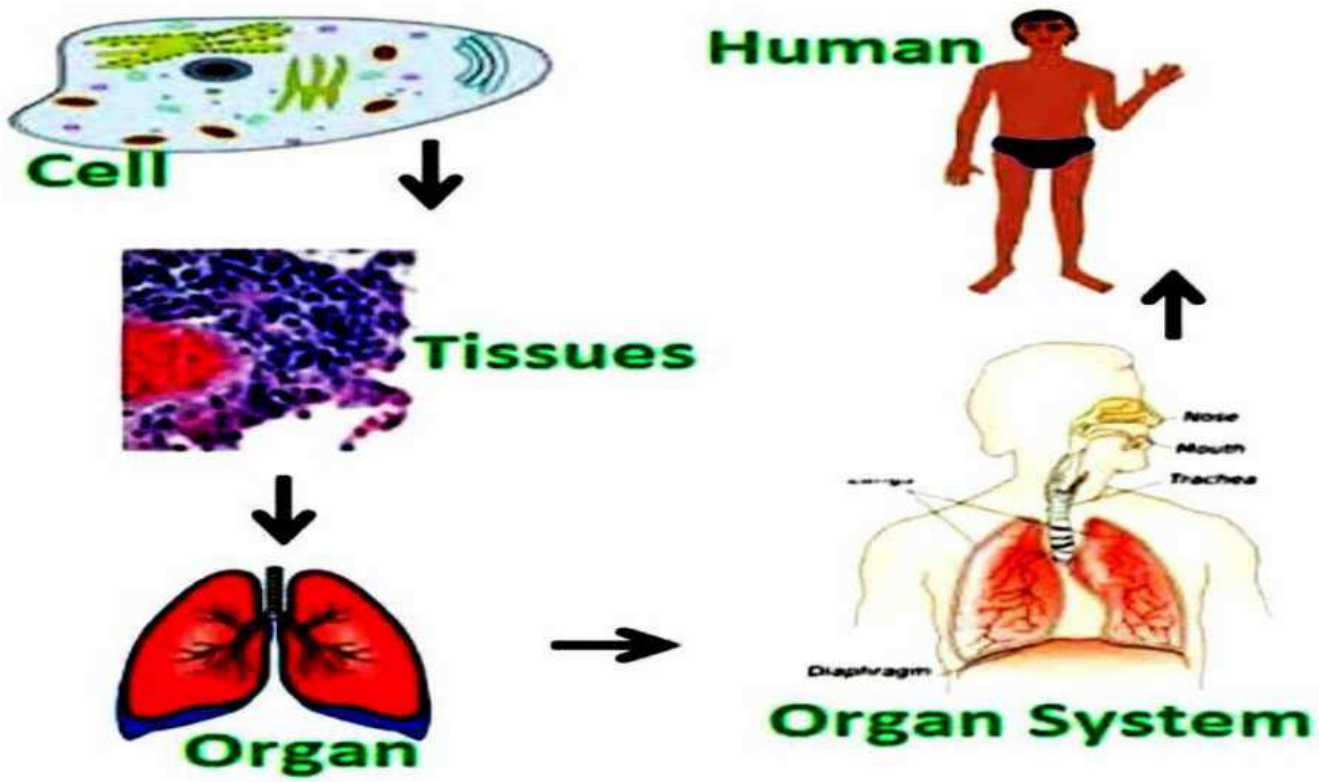
Unit (3) Lesson (1)

The cell as the basic unit of structure and function in living organisms

The cell: It is the basic unit of structure and function in any living organism.



Although all living organisms are similar in that the cell is the basic unit structure, function and vital processes they perform, they differ in many characteristics

Classification: the arrangement of living organisms into groups based on their similarities and differences to facilitate their study and identification.

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*Living organisms classified according to:

- 1-The number of cells that form the living organism
  - Unicellular organisms
  - Multicellular organisms
- 2- Structure of the nucleus
  - Prokaryotes
  - Eukaryotes

-First: Unicellular and Multicellular organisms

1-Unicellular organisms:

-Microorganisms characterized are by the following characteristics:

1- They are called unicellular organisms . (Give reason)

Because their bodies consist of a single cell.

2-Unspecialized means that the cell performs all vital processes necessary for life.

3- They are called microscopic organisms. (Give reason)

Because they can't be seen by the naked eye, but can be observed under a light microscope.

Examples:

-Yeast fungus -Bacterla

-Protozoa such as Amoeba and Paramecium

-Euglena

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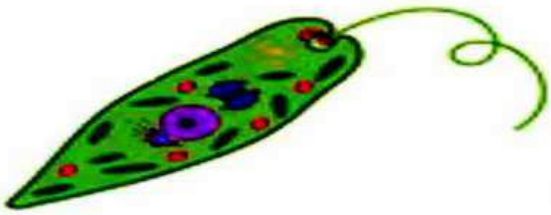
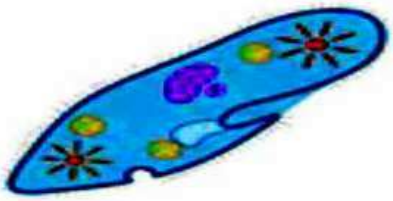
Unicellular organisms

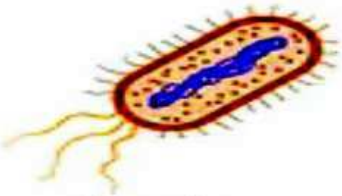
Chlamydomonas



Euglena



Paramecium



Bacterium

Amoeba

Yeast

2-Multicellular organisms:

-Living organisms characterized by the following characteristics:

1- They are called multicellular organisms. (Give reason)
Because their bodies consist of many cells.

2-Their cells are differentiated. . (Give reason)
Because they vary in their shape and Structure.

3-Their cells are specialized in their function. (Give reason)
Because each group of cells performs specific vital processes.

4-Relatively large in size and can be seen by the naked eye.

Examples:

-Plants -Animals

-Fungi, such as: Bread mold fungus and mushroom fungus.

Fungi

Animals

Plant

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-Second: Prokaryotes and Eukaryotes:

P.O.C	Prokaryotes	Eukaryotes
Living organisms characterized by the following characteristics	- All are unicellular. - Simple in structure. -Relatively small in size. -Their genetic material in the cell is found in the cytoplasm and not surrounded by nuclear membrane. -Many cell organelles are missing.	-They may be unicellular or multicellular. -Their bodies are more complex. -Relatively large in size. -Their genetic material in the cell is surrounded by a nuclear membrane separating it from the cytoplasm (True nucleus). -They contain many cell organelles.
Examples	-Bacteria	-Yeast fungus, Euglena. -Protozoa as: Amoeba, Paramecium(unicellular organism) -Plants like beans and animals like lion (multicellular organisms). -Fungi as: bread mold fungus and mushroom fungus(multicellular organisms)

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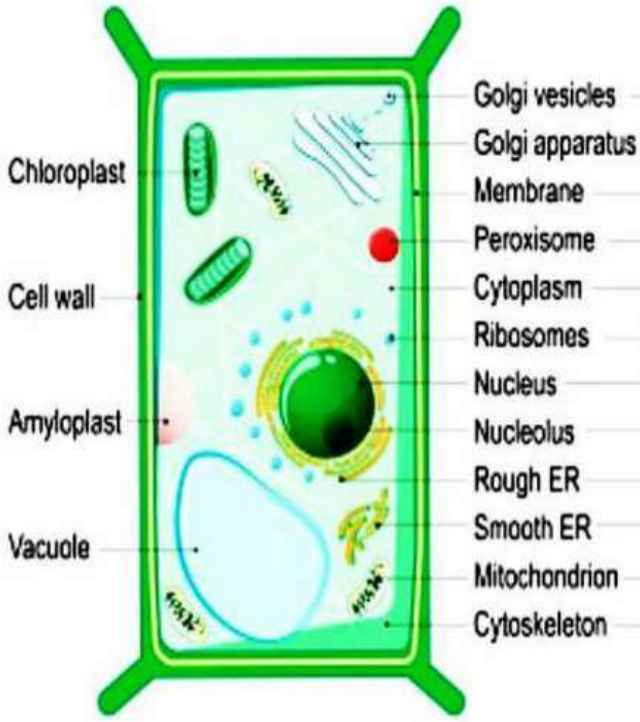
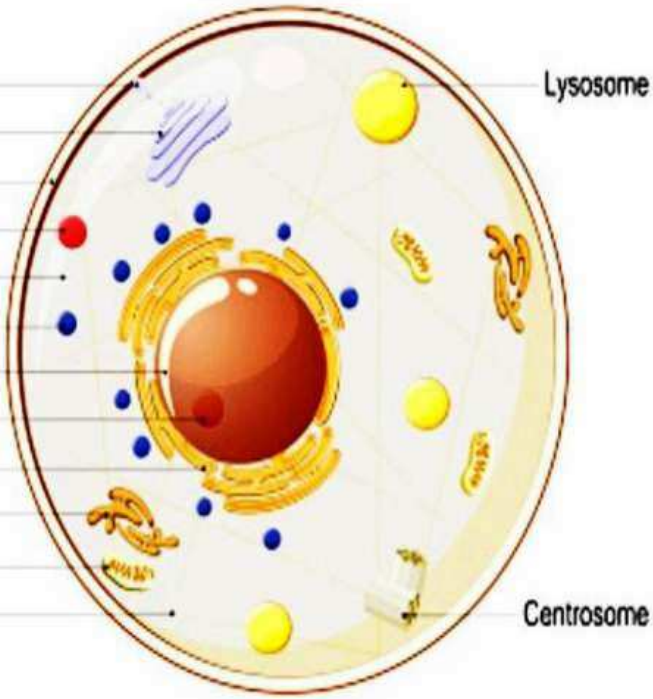
-The detailed structure of a bacteria cell (Prokaryote), a plant cell and an animal cell (Eukaryote):

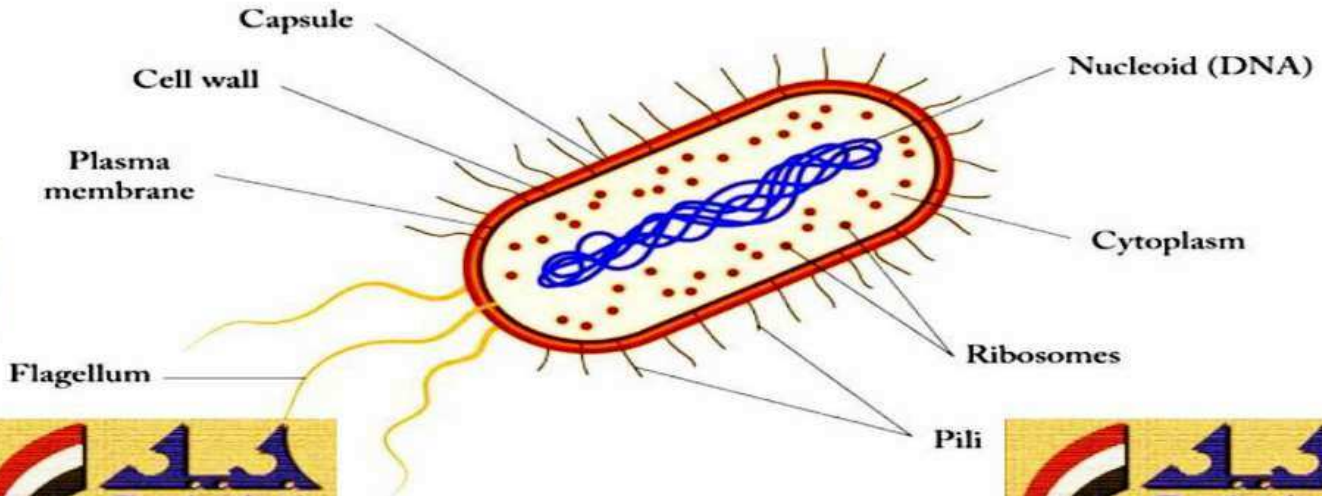
Plant cell



Animal cell



BACTERIAL CELL



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1-The bacterial, animal and plant cells all share the presence of

-Plasma membrane (cell membrane) -Cytoplasm

-Ribosomes

2-The plant cells share with the animal cells the presence of:

-Plasma membranes (cell membrane) -Nucleus

-Cytoplasm.

-Cell organelles such as:

-Golgi apparatus -Ribosomes

-Endoplasmic reticulum -Mitochondria

-Vacuoles

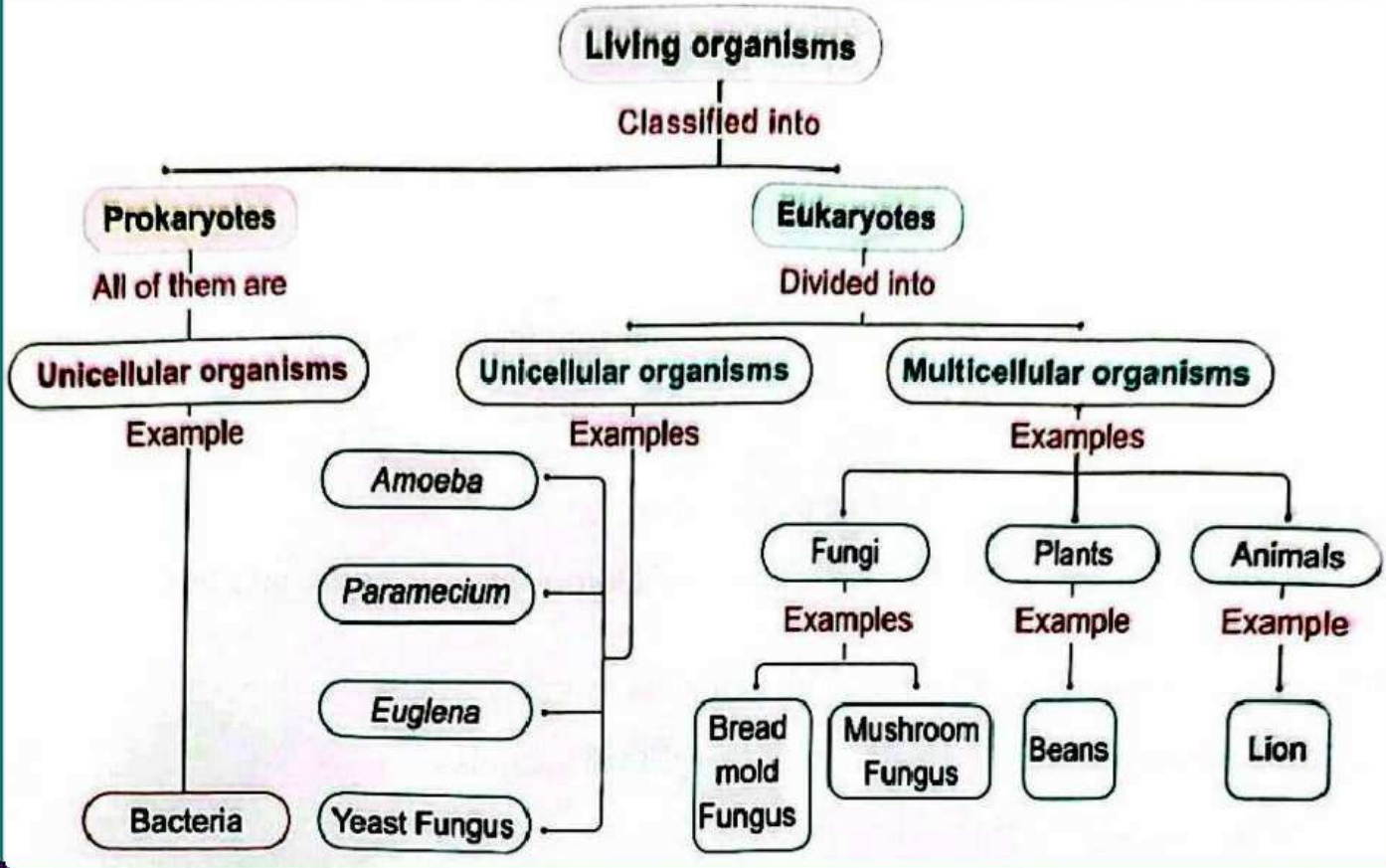
3-The plant cell differs from the animal cell in the presence of:

-Cell wall -Chloroplasts -Large vacuole.

4-The animal cell differs from the plant cell in the presence of:

-Centrosome -Small vacuoles.

-The classification of living organisms based on the type of their cells:



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-Stem cells:

-Various pottery artifacts created by the Egyptian artists from clay in the pottery village in Fustat city.

-Cell can be transformed into many types as into clay which can be transformed into various shapes of pottery.

Cells in higher animals and humans known as stem cells.

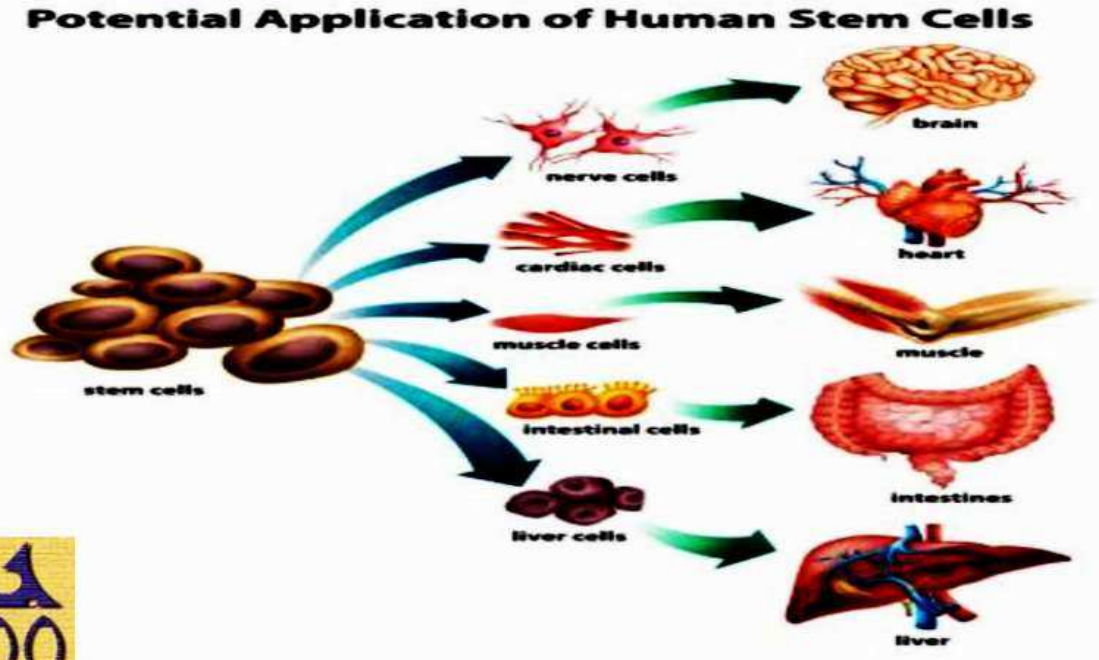
Stem cells: Undifferentiated cells that have the ability to be transformed and differentiated into all the differentiated cells of the body that perform a specialized function.

-Stem cells in humans:

-It's characteristics:

1-Their ability to renew themselves through division and produce more stem cells.

2-Their ability to differentiate into specialized types of cells found in the body.



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Note: **The function of the cell differs depending on its structure.**

For example: **The composition of muscular tissue from long muscle cells (fiber) allows it to perform the functions of contraction and relaxation.**

-Medical Applications:

-Researchers hope that stem cell studies will help to:

-Increase understanding of how diseases occur, by observing cell differentiation, it's possible to understand when they turn into healthy or diseased cells.

-Regenerate healthy cells to replace cells infected by disease.

-Test new drugs before used to determine their safety and effectiveness, where stem cells are grown in the laboratory and treated them with the tested drugs.

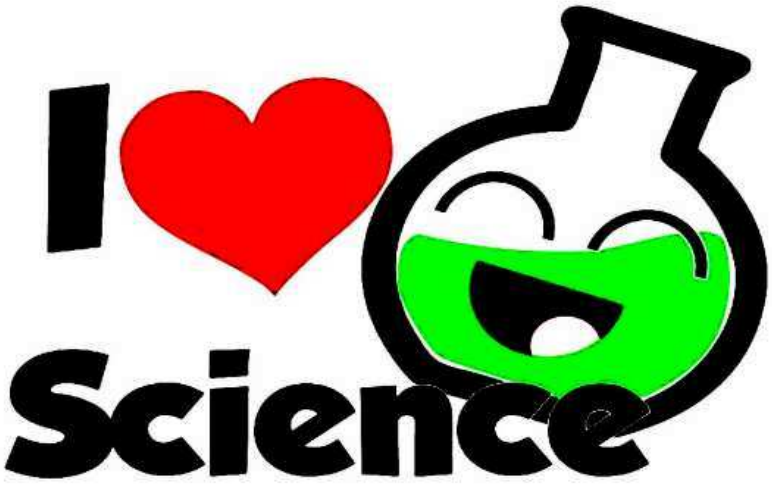
-Scientific experiments have proven the effectiveness of stem cell therapy in certain diseases such as:

-Bone marrow failure

-Heart and vascular diseases

-Diabetes

-Burns



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Worksheet (1)

1-Write the scientific term of each of the following statements.

1-Microorganisms whose bodies are made of a single, unspecialized cell and can't be seen by the naked eye. (.....)

2- Living organisms whose bodies are formed of differentiated and specialized cells. (.....)

3- Cell organelles shared by both prokaryotic and eukaryotic cells. (.....)

4- A cell organelle that is large in size in a plant cell compared to animal cell. (.....)

5- The classification of living organisms into groups based on their similarities and differences. (.....)

2- Compare between prokaryotes and eukaryotes.

.....

.....

.....

3- What are the properties that characterize stem cells in humans?

.....

.....

4-Give reasons for:

1-Bacteria are classified as prokaryotes.

.....

2-Euglena is classified as an eukaryote.

.....

3- Stem cells can produce more of themselves.

.....

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5-What is meant by?

1- Classification.

……

2- Microscopic organisms.

……

3- Stem cells.

……..

6-complete the following sentence:

1-The cell is the basic unit of ……and ……in a living organism.

2- From examples of microscopic organisms……, ……and paramecium.

3- Euglena is classified as…… while bread mold fungus is classified as……organism.

4- Multicellular eukaryotic organisms include fungi, …… and ……

5-Plant cells differ from animal cells in the presence of ……, …… and ……

6- Stem cells are found in multicellular organisms like…… and

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Lesson(2)

Characteristics of living organisms

Characteristics that distinguish living organisms from non- living materials such as:

1-Nutrition	2-Respiration	3-Transport
4-Excreion	5- Movement	6-Growth
7-Sensation	8-Reproduction	9-Adaptation.

1-Nutrition:

One of the characteristics of living organisms in which they obtain food, that represent the main source of energy and produces substances that are used in building their body.

Autotrophic organisms (Autotrophs): Organisms that can make their own food through photosynthesis and they are called producers.

Heterotrophic organisms (Heterotrophs): Organisms that depending directly or indirectly on other producers to obtain their food and they are called consumers.

The nutrition in prokaryotes

*Prokaryotes obtain their food in various ways, they may be:

-Autotrophs or -Heterotrophs

-Example: **Bacteria**

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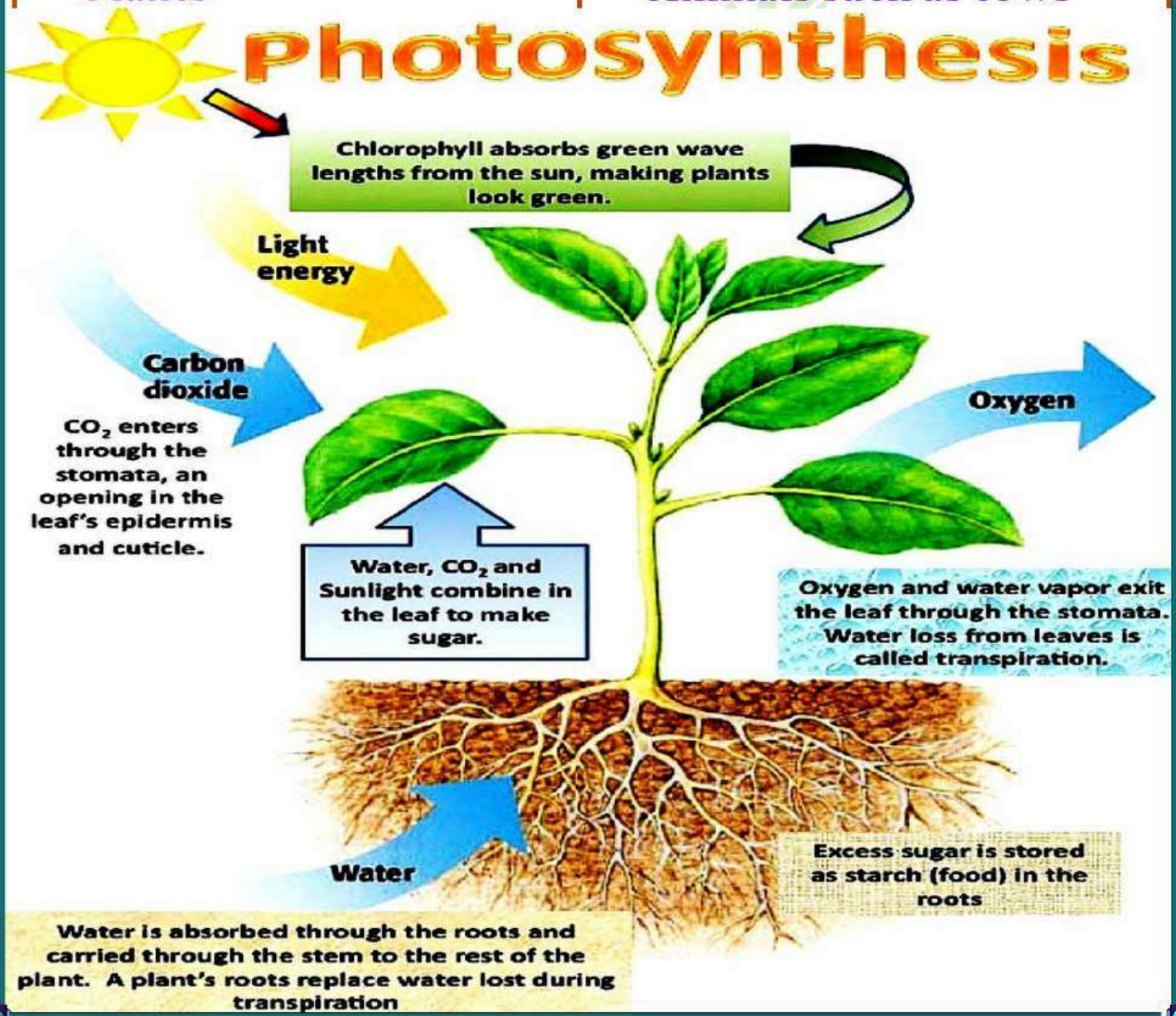
The nutrition in Eukaryotes

Autotrophs (Producers)	Heterotrophs (Consumers)
-Organisms that can produce their food through photosynthesis process that occurs in chloroplasts. **Examples:** **-Green algae** **-Plants**	-Organisms that depended directly or indirectly on other producers to obtain their food. **Examples:** **-Human** **-Animals such as cows**


Photosynthesis
Chlorophyll absorbs green wave lengths from the sun, making plants look green.
Light energy
Carbon dioxide
CO_2 enters through the stomata, an opening in the leaf's epidermis and cuticle.
Oxygen
Water, CO_2 and Sunlight combine in the leaf to make sugar.
Oxygen and water vapor exit the leaf through the stomata. Water loss from leaves is called transpiration.
Excess sugar is stored as starch (food) in the roots
Water
Water is absorbed through the roots and carried through the stem to the rest of the plant. A plant's roots replace water lost during transpiration

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1- The inorganic substances used in photosynthesis are:

-Water, Mineral salts and Carbon dioxide gas.

2- The products of photosynthesis are:

-Glucose **(an organic substance)**

-Oxygen **(an inorganic substance)**

3- The substance responsible for absorbing light energy in plants: Chlorophyll.

4- The substance produced by the plant as food from which it obtains energy: Glucose

5-The equation of photosynthesis represents the conversion of light energy into stored chemical energy:

Water + Carbon dioxide gas + Light energy → Glocose + Oxygen

***Technological Application:**

Artificial photosynthesis

Scientists have developed a technological method that mimics photosynthesis in the form of artificial leaves that resemble green plant leaves.

These leaves are supplied with hydrogen gas and absorbed carbon dioxide gas emitted from cars exhausts, factories and the power station to produce environmentally friendly fuel, to reduce the global warming caused by the increase percentage of carbon dioxide gas in the atmosphere that leads to the elevation of Earth's temperature.

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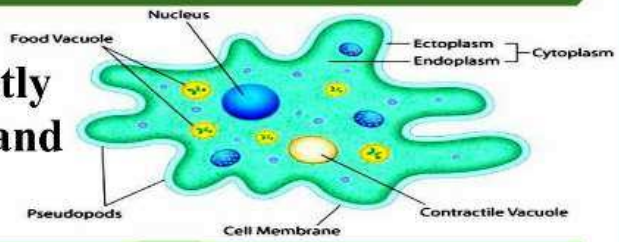
2-Respiration:

Respiration: a process by which living organisms obtains oxygen gas directly from its surrounding environment or through a respiratory system and realized carbon dioxide during gas

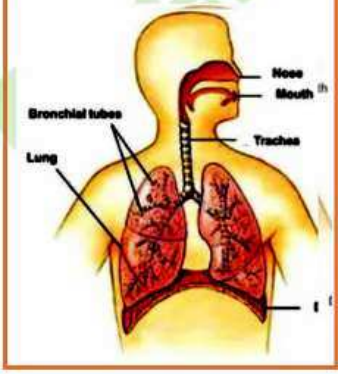
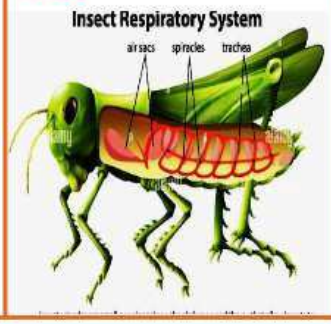
Respiration in unicellular organisms.

-Unicellular organisms: prokaryotes or eukaryotes obtain oxygen gas directly from their surrounding environment and release carbon dioxide gas.



Respiration in multicellular organisms

-The respiratory organs responsible for obtaining oxygen differ in multicellular organisms (eukaryotic) based on their type,
for example: human and animals.

Mammals	Amphibians	Fish	Insects
They obtain oxygen from the atmospheric air through the respiratory organ lungs Ex:	They obtain oxygen from the atmospheric air through the respiratory organs, lungs and skin. Ex:	They obtained the solved oxygen in water through the respiratory organ gills. Ex:	They obtain oxygen from the atmospheric air through the respiratory organ tracheal tubes. Ex:
			

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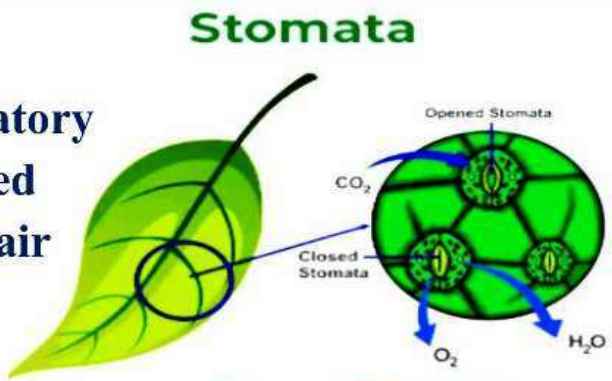
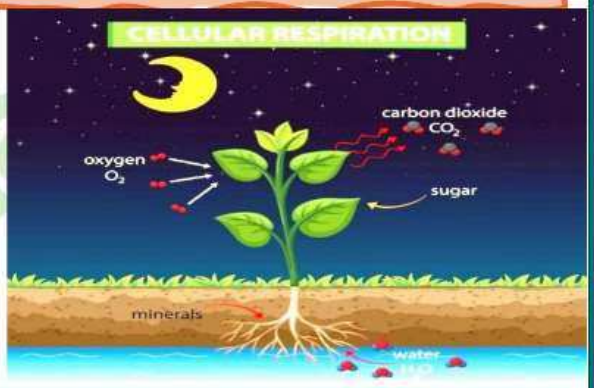
-Plants:

Plants don't have a specialized respiratory system but they obtain oxygen required for respiration from the atmospheric air **through natural openings on the leaves called stomata.**



Cellular respiration: It's a vital process involves breaking down organic nutrients, especially glucose, in the presence of oxygen to release the energy required to carry out all biological activities.



-Location where it occurs:

Mitochondria in the eukaryotic cells.

-When it occurs:

throughout the day and night.

-The equation that represents it:

Glucose + Oxygen → Water + Carbon dioxide + Energy

Importance of chloroplast and mitochondria:

1-**Chloroplasts in green plants: carry out photosynthesis and produce glucose and oxygen.**

2- **Mitochondria**: **use glucose and oxygen to release energy during cellular respiration, producing water and carbon dioxide, which the chloroplasts reuse in the photosynthesis once again.**

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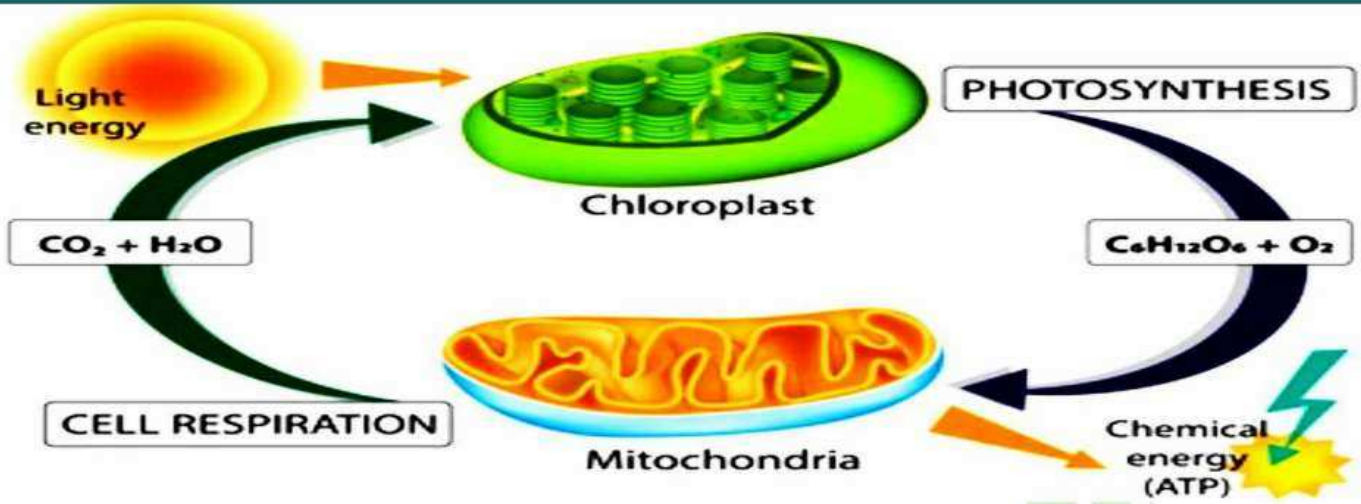
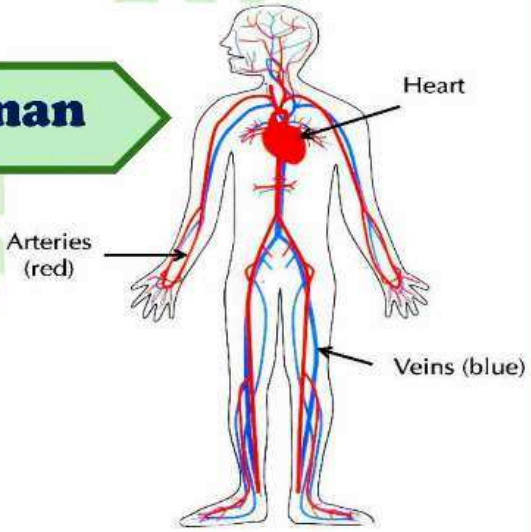


3-Transport:

The circulatory system in human



-Structure:

It consists of three main parts:

1- **The heart.**
2- **Blood vessels which include:**
arteries, veins, blood capillaries
3- **Blood.**

P.O.C	Arteries	Veins
Description	Blood vessels that carry the blood away from the heart to all the body parts	Blood vessels that carry the blood from all the body parts to the heart
Importance	Most of them carry blood rich in digested food and oxygen gas from the heart to all the body cells.	Most of them carry blood containing waste products and carbon dioxide gas to the heart.

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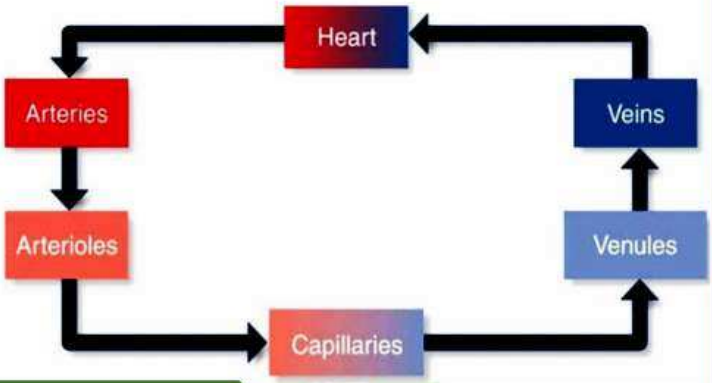
-Function:

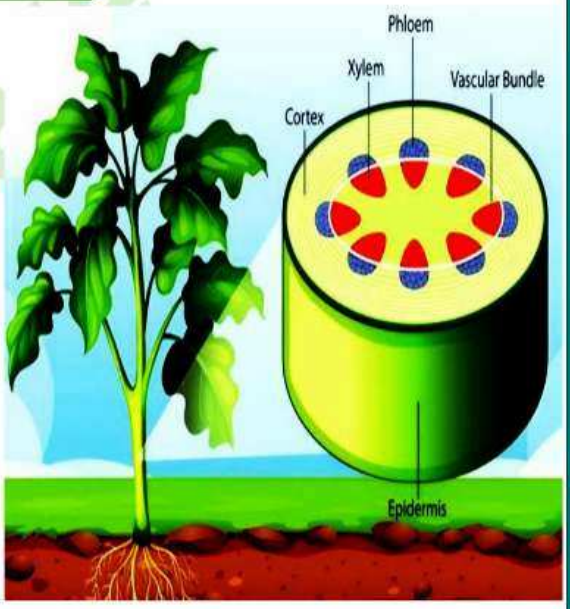
Transport digested food and oxygen extracted from the atmospheric air through the blood.

The blood carries them to the heart that pumps them to all the cells of the body and then it returns to the heart once again in a closed cycle described as the circulation.



The transport system in plant

-Circulation process in the human body corresponds to the process of transport in plants, which occurs through two types of tissues which include:



1-Xylem tissue:

It transports water and mineral salts from the roots to the rest of the plant until reaching the leaves.

2-Phloem tissue:

It transports the food Produced by Photosynthesis from the leaves to the rest of the plant.

4-Excretion:

Excretion: a process by which living organisms get rid of harmful waste products resulting from vital processes as well as excess substances.

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Excretion in human

-Biological processes inside the human body produce excretory substances including:

1- Carbon dioxide gas
2-Excess water
3- Excess salts
4- Urea.

Organ	Excretory substances	Way of elimination of it from the body
The lungs	Water vapor and carbon dioxide gas	Exhale air
The kidneys	Excess water, salts and urea	In the form of urine
Sweat glands in the skin	Excess water and salts	In the form of sweat

***Technological Application:**

The dialysis machine is used for patients who suffer from kidney failure.

This device performs the function of the kidneys through purifying the blood from the toxins when the kidneys stop working properly.

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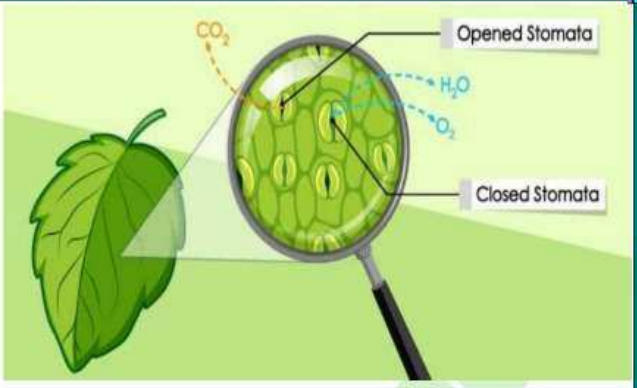
Excretion in plants



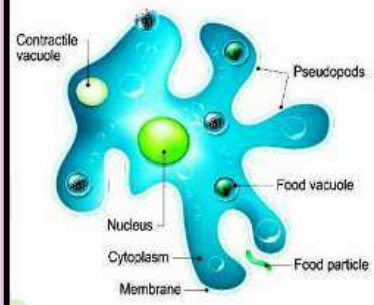
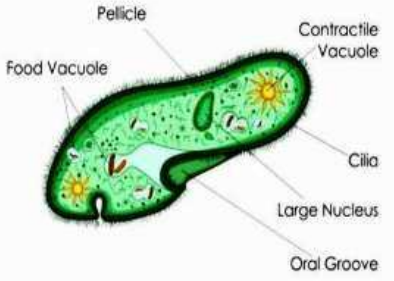
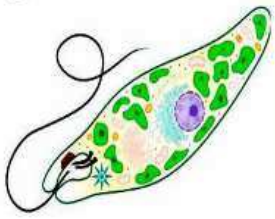
-Plants eliminate excess water vapor and carbon dioxide gas through minute pores called **stomata**, where their opening and closing are controlled by **guard cells**.

Guard cells: Specialized cells that control the opening and closing of stomata in plant leaves.

5-Movement:

Movement: The process that enables the living organisms to move from one place to another.

Movement in unicellular Eukaryotes

Living organisms	Amoeba 	Paramecium 	Euglena 
Means of movement	Pseudopodia (false feet)	Cilia	Flagellum

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Movement in multicellular Eukaryotes

*In human:

-Musculoskeletal system:

It is responsible for the movement of the human body.

*In the plant:

-Plant movement isn't locomotion (movement to change the position and the location) like in animals, but it IS limited and appears in several forms such as:

1-The opening of the Gazania flowers during the day and closing at night.

2-The drooping and folding up of Mimosa plant leaves upon touch.

3-The movement of the Sunflowers to follow the movement of the sun as it rises and sets.

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Worksheet (2)

1-Compare between: The respiration organ in each of mammals, fish and insects.

.....

.....

.....

.....

2-Write the scientific term of the following:

1- A biological process in which substances are produced that are used in building their bodies. (.....)

2- Structure in insects through which they obtain oxygen from the atmospheric air. (.....)

3- A vital process involves breaking down organic nutrients, especially glucose in the presence of oxygen. (.....)

4-Blood vessels that cleave the heart, most of which carry blood rich in digested food and oxygen. (.....)

5- Tissue that transports food from the leaves to other parts of the plant. (.....)

6- Specialized cells that control the opening and closing of the stomata in plants leaves. (.....)

7- Movenment to change the position and the location.

(.....)

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3- Put (√) or (x) :

1-All eukaryotes have specialized respiratory systems. ( )

2-The respiratory organ in insects differs from that in fish. ( )

3-Plants carry out respiration during the day and stop at night. ( )

4-The process of circulation in humans and transport in plants are similar. ( )

5-Blood circulates in an open cycle in human. ( )

6-Arteries Connect to veins through Blood capillaries. ( )

7-Water and minerals salts transported through phloem tissue, while food transport through xylem tissue. ( )

4-Give reasons for:

1-The camel is a heterotrophic organism.

.....

.....

2-Photosynthesis and respiration in plants are opposite processes.

.....

.....

3-Blood flows in a closed cycle in humans.

.....

.....

4-Phloem tissue in plants is functionally similar to most arteries in humans.

.....

.....

5-Plants can get rid of excess water.

.....

.....

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6-Cattle are considered consumers.

.....

.....

5-What happens if:

1-Chloroplasts are absent from the plant cell.

.....

.....

2-The kidneys stop working properly.

.....

.....

3-Stomata disappear from plant leaves.

.....

.....

4-The necessary food for the living organism is not available.

.....

.....

5-Guard cells are absent from the structure of stomata.

.....

.....

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Unit (3) Lesson. (3)

The Microbes

Microbes

-They are microscopic living organisms(can't be seen by naked eye) .

-They around us found everywhere even inside our bodies.

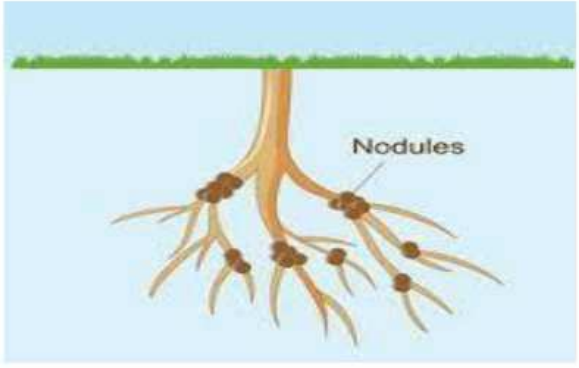
-They can be beneficial or harmful.

Classification of Microbes:

1- Prokaryotes

Such as: Bacteria

A) Root nodule bacteria.



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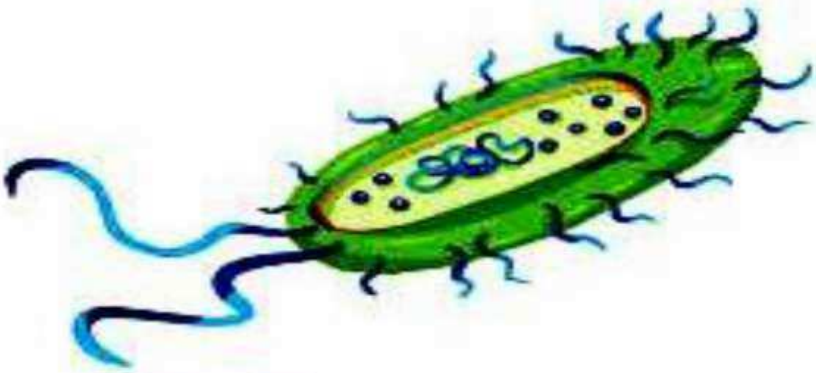
B- Decomposition bacteria.

C- Lactic acid bacteria.



D- Salmonella Typhi bacteria.

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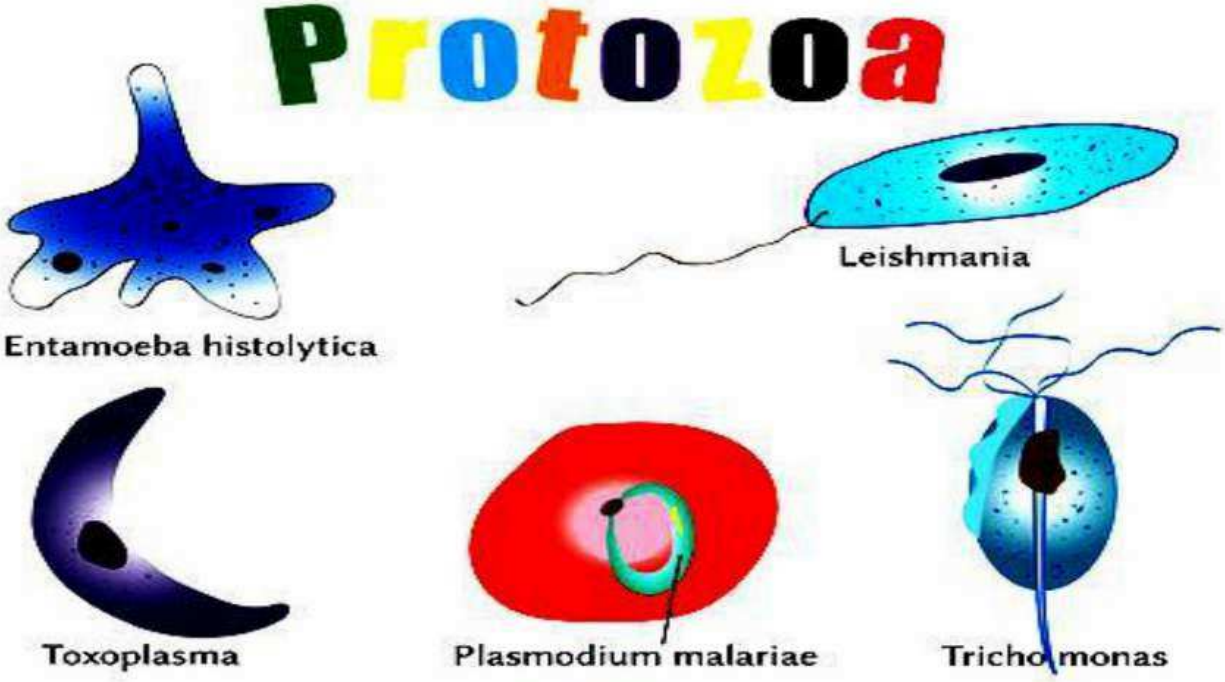
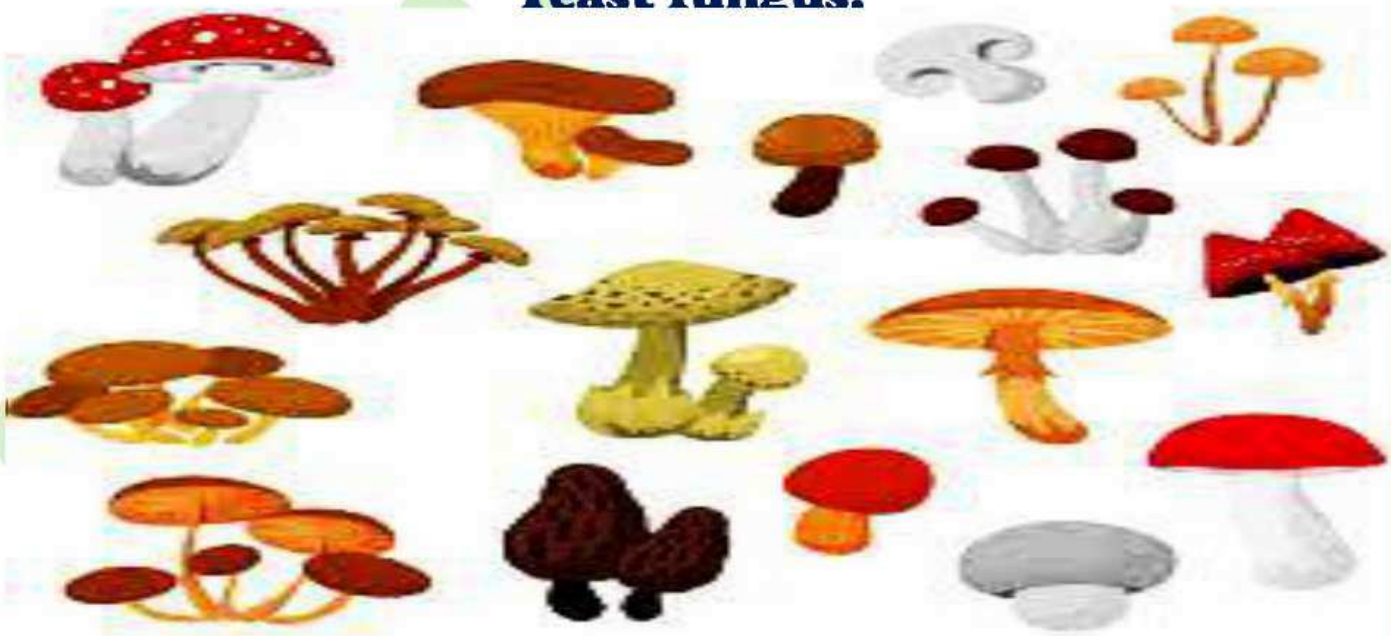
2- Eukaryotes

a) Protozoa: Such as: Entamoeba Histolytica.



b) Fungi : Such as: Pencillium fungus.

Yeast fungus.



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1-Root nodule bacteria and Decomposition bacteria:

-Plants need **Carbon, Hydrogen and Oxygen** to form **Carbohydrates** in process of **photosynthesis.**

-**Nitrogen** is important to form proteins (used in cell and tissues growth.)

Root nodule (Nodular)

A type of beneficial bacteria that live inside nodules on the roots of leguminous plants such as clover, beans and peas providing them with nitrogen to produce the proteins which are used in the growth of their cells and tissues.

(Nodular) Bacteria live in special structures called root nodules.

-Decomposition bacteria (decomposers) obtain their food by decomposing dead and remains of plant and animal substances

Give reason: The roots of legumes contain root nodules.

Because it contains nodular bacteria that provides the plant with nitrogen to build proteins used in the growth of its cells and tissues.

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Life Applications

After harvesting leguminous plants, farmers leave their roots in the soil.

Because the roots decompose into nitrogenous compounds that soluble in water, which increase the fertility and maintain the cycle of the necessary elements in nature.

2-Lactic acid bacteria:

-It used in making yogurt.

Yogurt is rich in:

- Protein to body building and muscle growth.

-Calcium to healthy bones and teeth.

-Lactic acid bacteria convert lactose (milk sugar) into lactic acid, it gives yogurt its distinctive sour taste and thickness.

How to make yogurt?

1- Heat one liter of milk with continuous stirring until it boils for 25°C minutes. To kill any bacteria that may be found in the milk.

2- Let the milk cool down to warm (at a temperature. Of 42°C).

3- Add a half a cup of previously prepared yogurt to the milk. Bec. it contains lactic acid bacteria.

4- Pour the milk into suitable containers and leave them in a warm place (from 35°C to 45°C) for 4 to 5 hours.

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To complete the fermentation of the milk to be thicker and change its taste into the distinctive sour taste of yogurt.

5- Put the yogurt containers in the fridge until it is used.

To stop the activity of lactic acid bacteria.

If you keep the yogurt out of the refrigerator, the activity of lactic acid bacteria will continue, producing more lactic acid so the acidity of yogurt increases and spoils its taste.

Life Applications

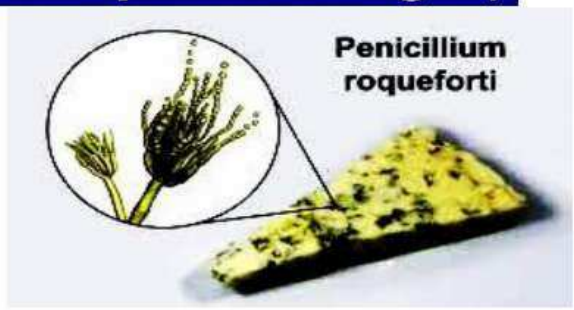
-During making pickled olives add a spoonful of sugar to the salt solution.

To reduce the bitterness of the olives and improve the taste, as sugar acts as a food source for beneficial bacteria, which convert the sugar into lactic acid.

Beneficial Fungi

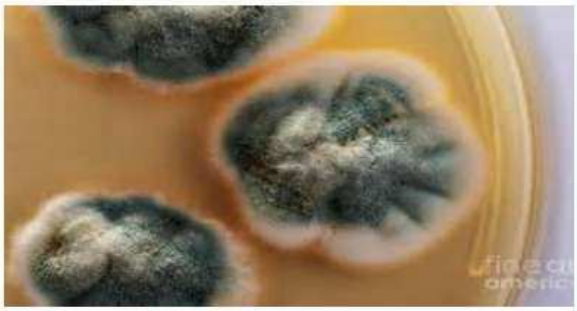
a- Penicillium Fungi (Penicillium Roqueforti fungus):

Used in making Roquefort cheese to give it distinctive taste and various color.



b) Penicillium Notatum fungus:

Penicillium Notatum secretes a substance that stops the growth and reproduction of a certain type of bacteria,



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so The English scientist (Alexander Fleming) extracted antibiotic from this substance which is called penicillin name after penicillium that

is used to kill bacteria that cause some diseases like: tonsillitis and diphtheria.

Give reason:

Roquefort cheese has a distinctive taste and various color

Due to the presence of penicillium Roqueforti fungus.

C) Yeast fungus:

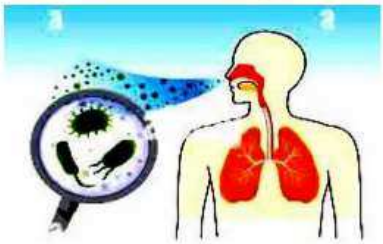
it is a source of vitamin (B) complex and rich in antioxidants, used in making bread and ethyl alcohol (ethanol)

Harmful microbes

Harmful microbes can enter our body through:

1- Breathing.

2- Eating contaminated food.



3- Penetration of the skin and reach to blood stream.

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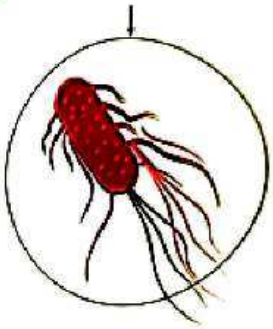
Some diseases caused by food contamination

Name of disease	Dysentery	Typhoid
Disease causing agent (pathogen)	A unicellular protozoan known as Entamoeba Histolytica (lives in the patient's large intestine). Entamoeba Histolytica	A type of bacteria called Salmonella Typhi (infects the human digestive (gastrointestinal) tract. -Bacterial disease.  Salmonella Typhi bacteria
How it is transmitted	During swallowing food contaminated with the microbe.	Through ingesting food or drinking water contaminated with salmonella Typhi.
Symptoms	1- repeated bloody diarrhea. 2- Weight loss. 3- Loss of appetite. 4- Stomach pain. 5- Continous fatigue.	1- High fever (reach to 40 ^{0}C). 2- Fatigue. 3- Stomach and muscle pain. 4- Headache. 5-Flatulence.
Treatment	Using antiprotozoal drugs	Using antibiotics

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Some healthy habits for dieses prevenation

- Washing vegetables and fruits throughly
- Not leaving food uncovered
- washing hands before eating and after using bath room
- Brushing teeth after meals
- Drinking at least 3 liters of pure water daily

What is the importance of brushing teeth after meals?

To eliminate bacteria that accumulate in the mouth after eating, to help preventing diseases and maintaining healthy teeth and fresh breath.

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Worksheet (3)

Q.1) Choose the correct answer :

1- Entamoeba Histolytica is a type of…….

a) fungi b) protozoa c) bacteria d) algae

2-The microbe used in the production of ethyl alcohol differs from the microbe that causes typhoid fever in containing……..

a) plasma membrane b) cytoplasm c) cell wall d) nucleus

3-Yogurt industry produces……..

a) ethyl alcohol only b)lactic acid only
c)ethyl alcohol and lactic acid d)lactose and lactic acid

4-All the following are classified as microbes that belong to prokaryotes or eukaryotes except …….

a) bacteria b) fungi c) viruses d) protozoa

5-Which of the following elements is absorbed by nodular bacteria from the soil?

a) carbon b) Hydrogen c) Oxygen d) Nitrogen

6- All the following are beneficial fungi except ……

a) Penicillium Roqueforti b) Pencillium Notatum c) Yeast d) bread mold

7- All the following describe Entamoeba Histolytica except that it ……

a) is a protozoan b) lives in the large intestine of the patient
c) is a unicellular d) enters the human body through respiration

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Q.2) Choose from column (B) what suits it in column (A):

A (Microbe)	B (The use)
1-Lactic acid bacteria	1-Production of a medicine for typhoid fever
2-Penicillium Roqueforti Fungus	2- production of ethyl alcohol.
3-Penicillium Notatum Fungus	3- production of some types of cheese
4-Yeast fungus	4-production of lactic acid 5-production of penicillin

Q.3) Complete the following:

(Salmonella Typhi - Penicillium Roqueforti -yeast fungus -Lactic acid bacteria - Entamoeba Histolytica)

1-……..is a beneficial prokaryotic microbe.

2-……..is a harmful eukaryotic microbe.

3-……..is a beneficial unicellular microbe.

4-……is beneficial multi cellular microbe.

Q.4)

Choose the odd one and state the relation between the rest:

1-Carbon / Hydrogen /Sulphur /Oxygen

……

2-Clover/ Corn / Peas / Beans

……..

3-Diphtheria / tonsillitis / typhoid fever / Dysentery

……..

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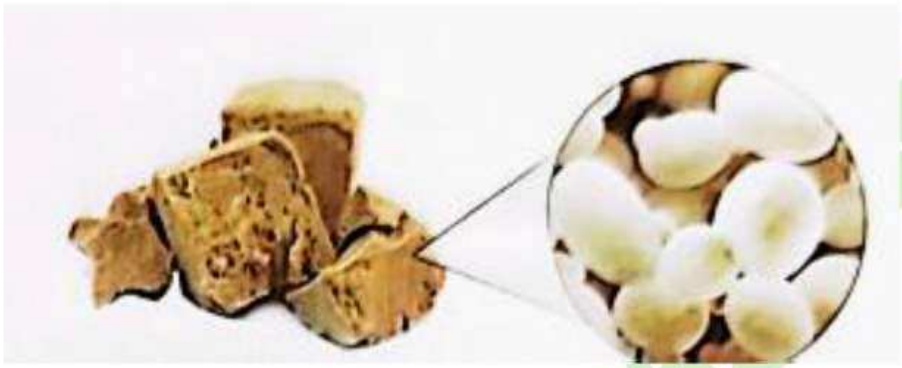
Q.5)The opposite figure represents one type of microbes :

1) What the name of this microbe?

……

2) Classify this microbe

……



3) This microbe has both nutritional and industrial importance for human

Explain?

……

Q.6) State some healthy habits that should be followed to prevent diseases.

……

……

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Unit (4) Lesson (1)

The solar system

The solar system consists of:

One star (the sun) and the eight planets revolve around it in elliptical path.

Give reason: The planets do not collide during orbiting the sun.

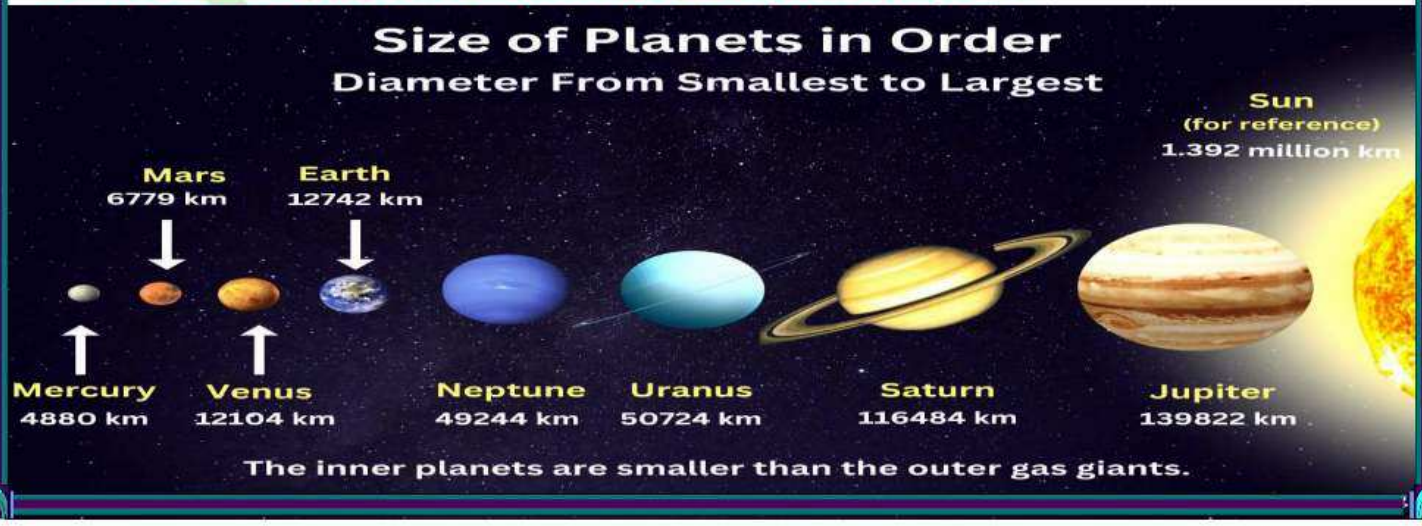
Because they orbit the sun in elliptical path at different distance from the sun.

Arrangement of the planets according to distance from the sun

*Earth occupies third order according to distance from sun

*Size :-fourth order (ascending order) / fifth order (descending order)

Arrangement of planets based on their diameters:



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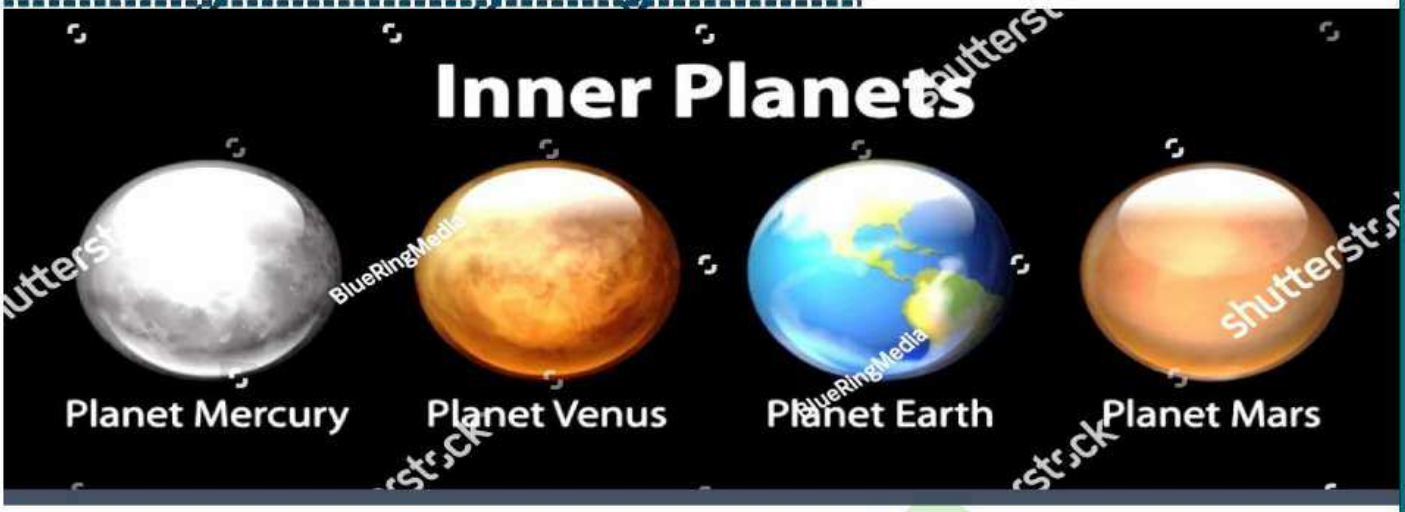
Classification of the planets



Are the four closest planets to the sun.

P.O.C	Mercury	Venus	Earth	Mars
composition	Rocky masses	Rocky masses	Rocky masses	Rocky masses
	Has very thin crust filled with craters caused by meteors impact	has thick crust compared to mercury's crust	Has thicker crust than Venus	Has thick crust relatively similar to earth's crust, it is known as red planet
Atmosphere	Very thin composed mainly of hydrogen and helium gases	Very dense Composed mainly of carbon dioxide	Composed mainly of nitrogen and oxygen	Composed mainly of carbon dioxide gas
Volcanic activity	No volcanic activity	More volcanic activity	More volcanic activity	There are indication of volcano but no current volcanic activity

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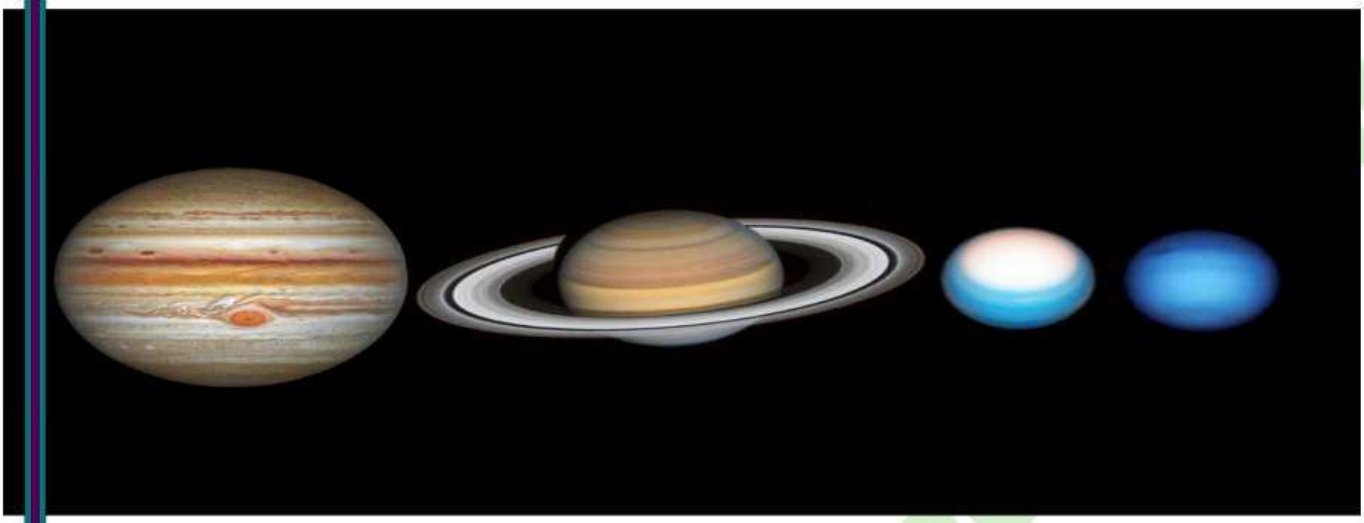
2- The outer planets



They are the four farthest planets from sun.

(Jupitar - Saturn - Uranus - Neptune)

P.O.C.	Jupiter	Saturn	Uranus	Neptune
composition	Gaseous planets	Gaseous planets	Gaseous planets	Gaseous planets
	Composed of gases only, they have no crust	Composed of gases only , they have no crust	Composed of gases and ice, they have no crust	Composed of gases and ice, they have no crust
atmosphere	Composed mainly hydrogen and helium	Composed mainly hydrogen and helium	Composed mainly hydrogen and helium in addition to methane give it Greenish blue color	Composed mainly hydrogen and helium in addition to methane gas known as blue planet
Volcanic activity	No	No	No	No

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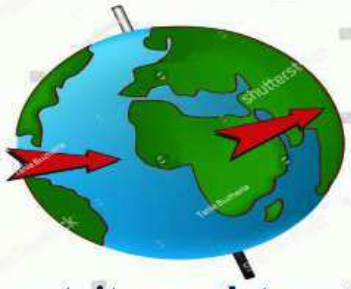
The sun –Earth system



1-Earth's rotation on its axis:-

Earth rotates around it is imaginary axis from west to east, it completes a full rotation every 24 hours around its axis.

Earth's axis

It is imaginary straight line extending from the north to the South Pole passing through earth's center; it tilts at angle of 23.5 from the imaginary perpendicular line to its orbit around the sun.

What are the results of

1-the tilt of the earth axis?

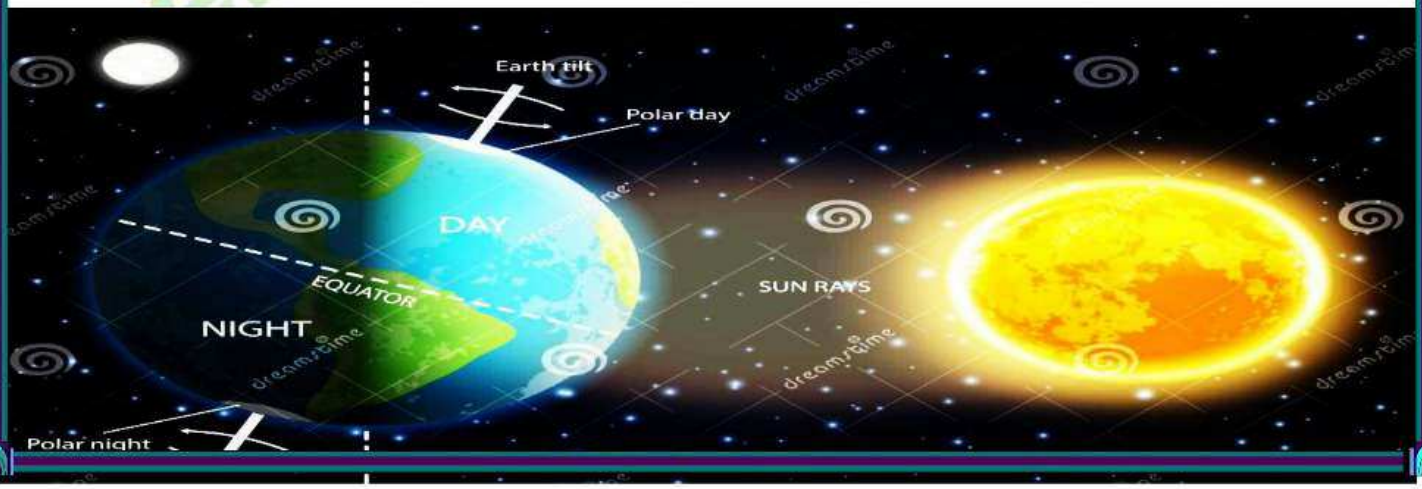
It results in the variation of the angle at which sunlight falls

Differences in the intensity of the sunlight falling on the unit area.

2- The rotation of the earth around its axis in front of the sun

***The alternation of day and night**

***The apparent motion of the sun**



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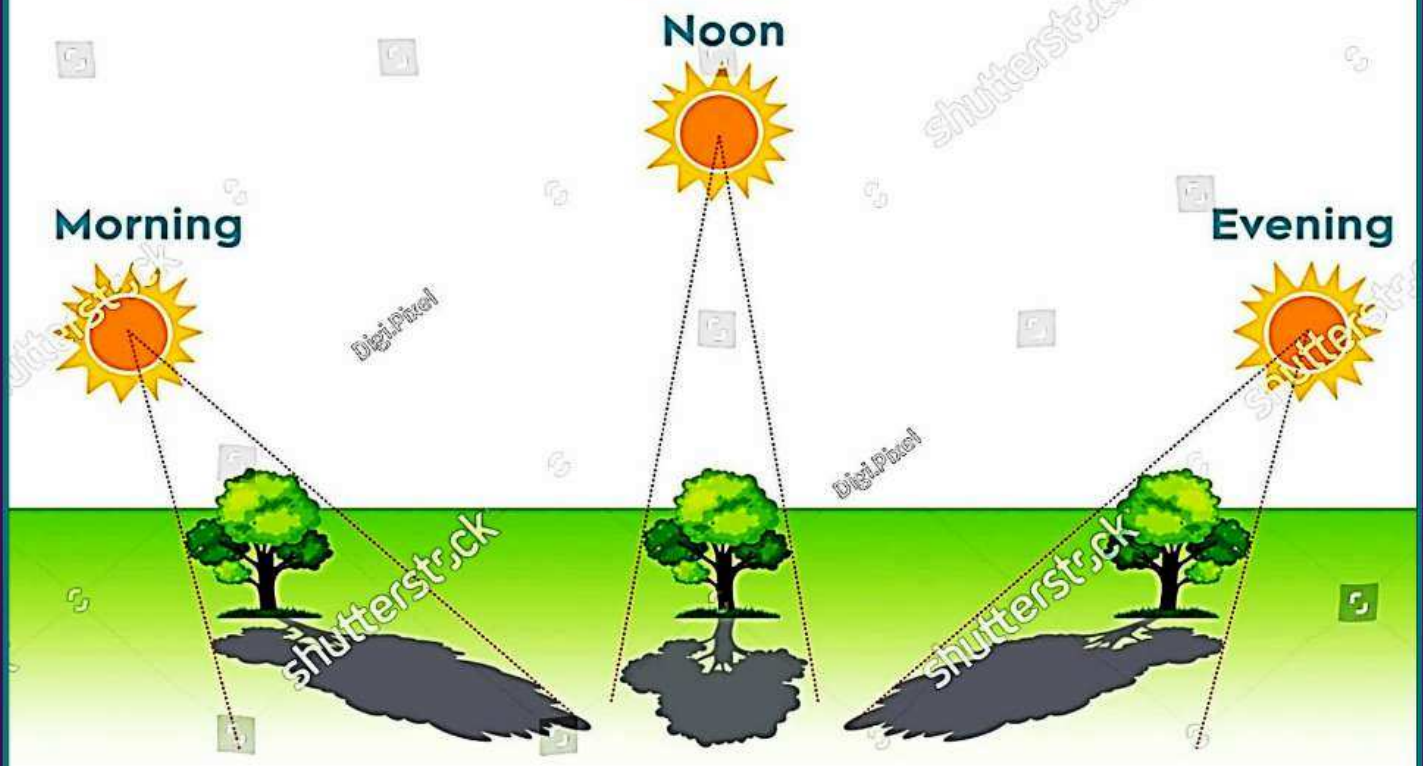
The apparent motion of the sun

The suns appearance in the sky throughout the day or the year as if its position is shifting from east to west while the earth rotates around its own axis

Between sunrise and noon	At noon	Between noon and sunset
The apparent height of the Sun increases gradually	The sun's apparent height reach the highest point	The sun apparent height decreases gradually

The length of shadow

Long at sunrise	the shortest at noon	the longest at sunset



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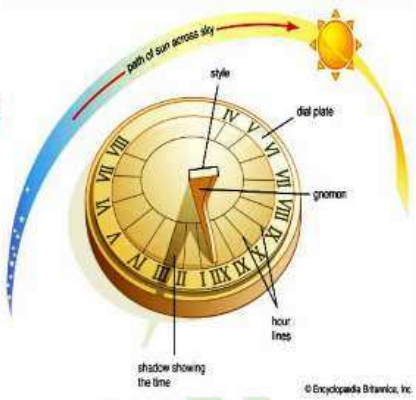
Note

Throughout the same day as the height of Increases , the shadow length decreases.

Sundial:- an ancient solar clock used to determine time according to length and direction of shadow



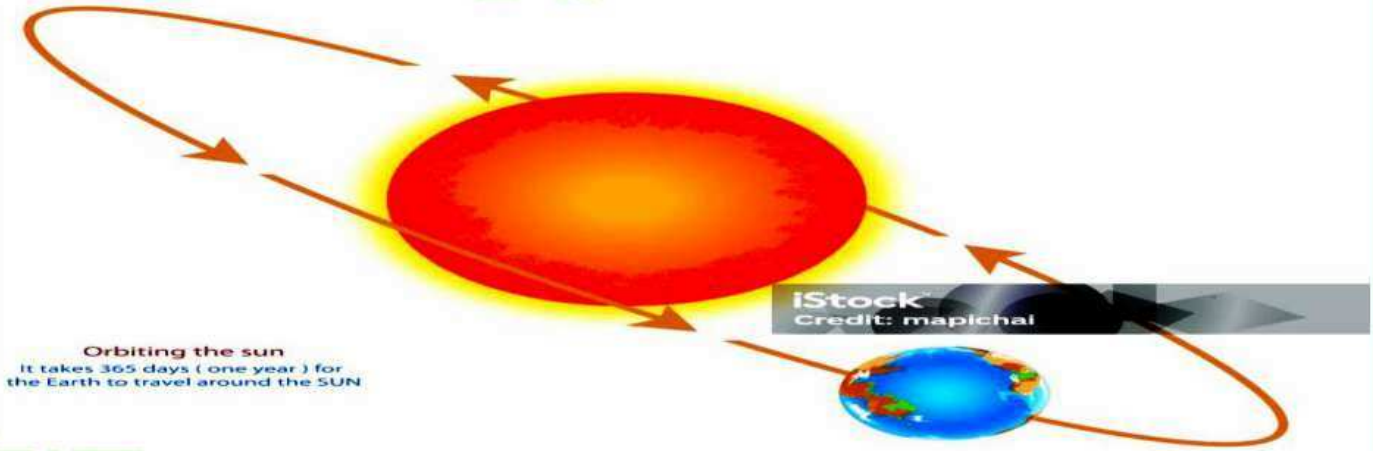
Give reason

The shadow length at noon is the shortest.

Because the sun's apparent height is at its maximum at that time.

2- Earth's orbit around the sun

The earth orbits around the sun every 365.25 days.



Orbiting the sun
It takes 365 days (one year) for the Earth to travel around the SUN

What happen due to;

Rotation of the earth around the sun.

The alternation of the four seasons (the cycle of the seasons).

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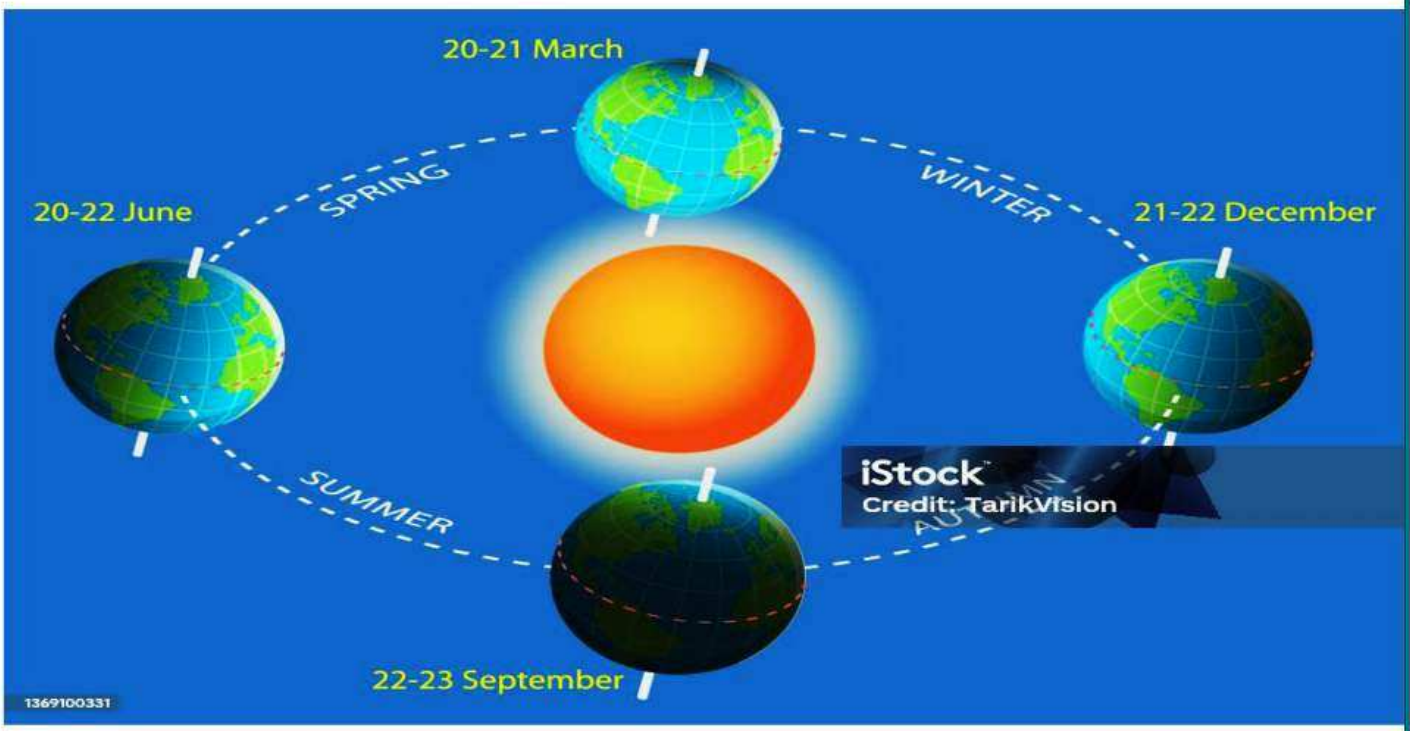
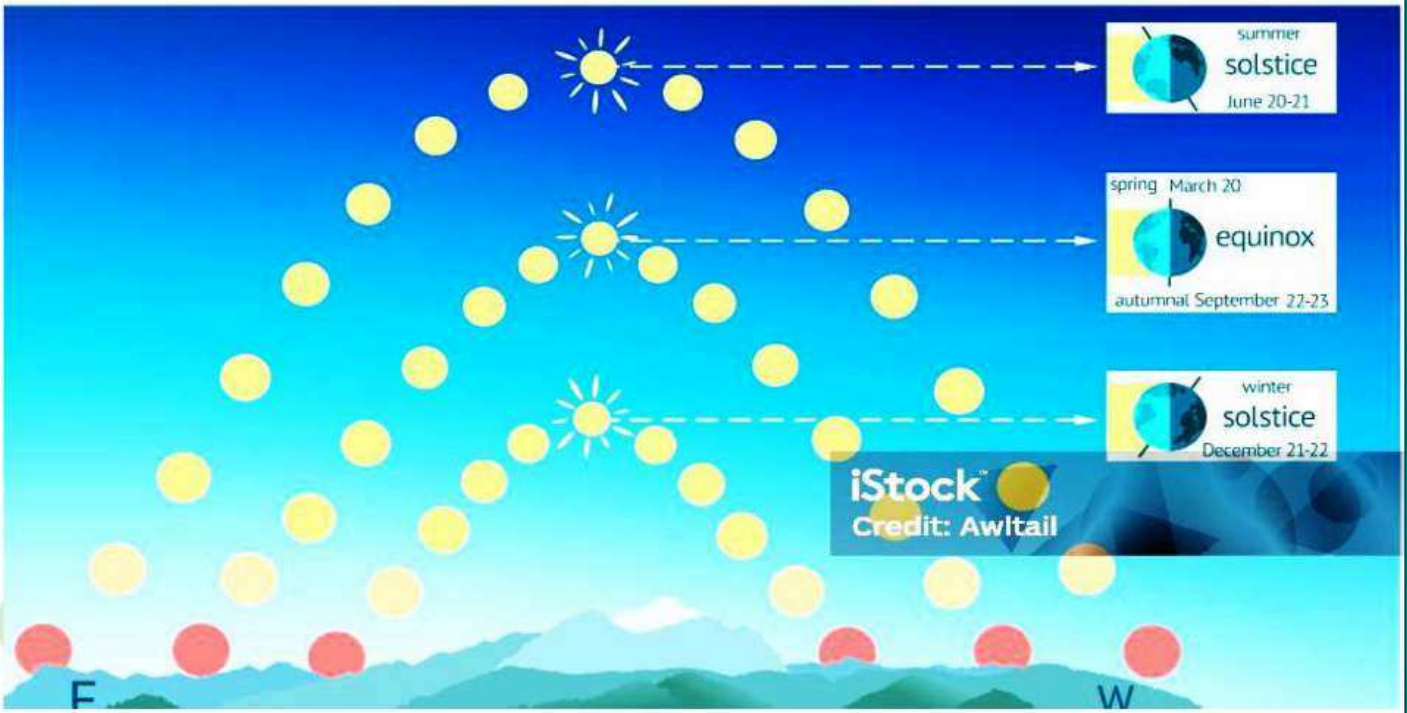
The relation between the earth's axis direction relative to the sun and the four seasons.





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Vernal (spring Equinox

- Occurs on March 21st
- The northern end of the earth's axis neither leans close to nor away from the sun.

Winter solstice

- Occur on December 22nd
- The northern end of the Earth's axis leans away from the sun (at an angle of 23.5◦).

Autumnal Equinox

- Occur on September 23rd
- The northern end of the Earth's axis lean close to nor away from the sun

Summer Solstice

- Occur on June 21st
- The northern end of the Earth axis lean closest to the sun (at an angle of 23.5◦)

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Variation of the day light and night hours throughout the seasons

Spring

* March 21st
* June 20th

Day light hours equal to night hours

Autumn

* September 23rd
* December 21st

Day light hours equal to night hours

Summer

*June 21st to September 22nd

* Day hours greater than night

*Summer crops:

(watermelon ,cucumber, onion zucchini)

Winter

* December 22nd to March 20th

* Day hours are less than night

* winter crops:

(orange , lettuce , wheat, clover)

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Worksheet (1)

Write the scientific term:-

1- A star which 8 planets orbit in elliptical paths. (……..)

2- Rocky planets with solid surfaces. (……..)

3- Gaseous planets with no volcanoes (……..)

4-Aplanets with many active volcanoes and its atmosphere is mainly composed of carbon dioxide gas. (……..)

5-A season when the apparent height of the sun in the sky is the lowest (……..)

6-A season when the number of the daylight hours is greater than the number of the night time hour. (……)

7-An equinox that occurs neither on September 23rd when northern end of earth's axis neither lean close to nor away from the sun (……)

Q.2) Put (√) or (x) for each statement with correction:-

1-Neptune is the second farthest gaseous planet from the sun. ( )

2-Mercury has a thin crust filled with craters caused by meteor impacts. ( )

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3-The sun's position in the sky changes throughout the day due to earth's revolution around the sun. ( )

4-The bluish green color of Uranus is due to the presence of methane gas. ( )

5-The difference in direction of the tilt of Earth's axis lead to a variation in the length of each of day and night during the season of the year. ( )

Q.3) Write the consequences of each of the following:-

1-The presence of methane gas in Uranus's atmposphere.

2- The apparent motion of the sun.

3-Earth's rotation on its axis one complete rotation every 24 hour

4- The passage of time from sunrise to noon and its effect on the length of the shadow of an object fixed on earth's surface.

Q.4) Choose the odd word out , then write the relation between the rest

1- sun/Jupiter/Earth/Mars

2-Mercury/Saturn/Earth/Mars

3-Mercury /Venus/Earth/ Mars

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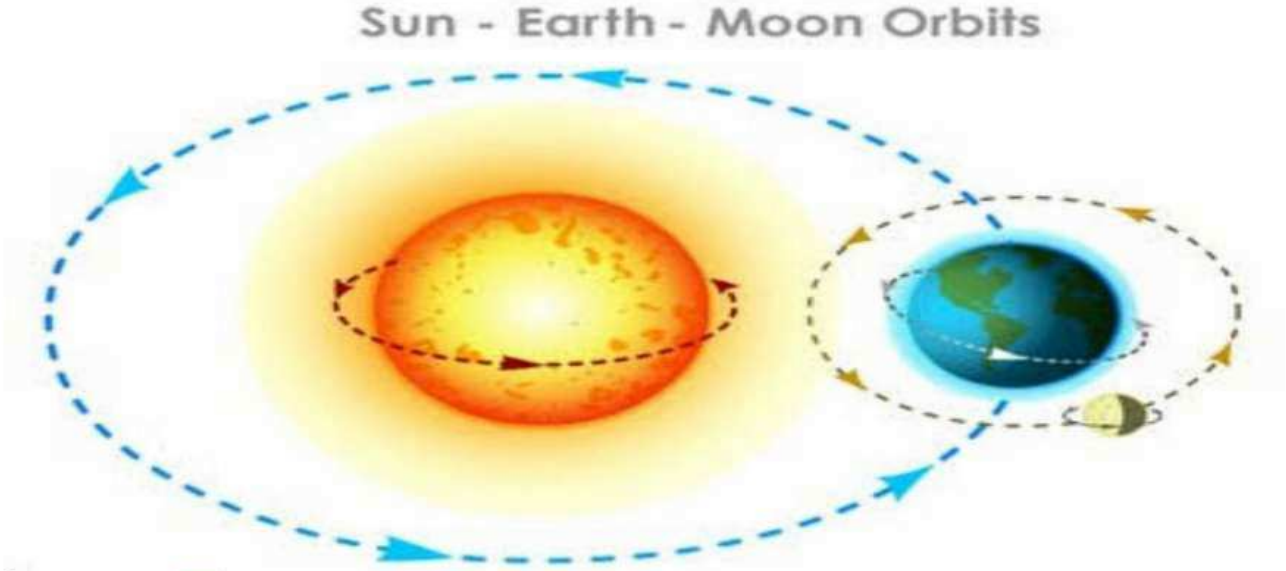
Lesson (2) Lunar Eclipse

The moon	
	It is a dark (opaque) body that orbits the Earth
	It is the closest celestil body to the Earth
	It illuminated as it reflects sunlight
	Its revolution around the Earth takes 29.5 days
	Its rotation around its own axis also takes 29.5 days

- **What are the consequences of time of a complete orbit of the moon around the Earth is the same time of its complete rotation around its axis ?**

The observers on Earth always see one side of the moon .



Moon phases

The phases of the moon	**They are the different stages that the moon goes through during its orbit around the Earth as a result of the changing of its position relative to both the sun and the Earth.**

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Notes :-

- The moon appears to change shape throughout the Arabic (Lunar) month .
- But it doesn't actually change in fact , what changes is size of the part of the moon that can be seen from the illuminated part that reflects sunlight .
- The moon orbits the Earth from east to west ,
- so its position relative to both the sun and the Earth changes , leading to eigh phases known as the phases of the moon .

The moon phases can be divided into two periods

- **1-First half of the lunar month**
- **2-Second half of the lunar month**

1-First half of the lunar month

Moon's visibility time	Percentage of the moon's orbit	Name of the phase	Appearance of the moon
Beginning of the lunar month	**1/8** of moon's orbit	**First (waxing) crescent**	-A small part of the side ↓ Illuminated on the right side
After **7 days** weekend	**2/8 or 1/4** of moon's orbit	**First Quarter**	Half the side ↓ Illuminated
On the **11th day**	3/8 of moon's orbit	**Waxing Gibbous**	3/4 of the side ↓ Illuminated
After 14 days (middle of the lunar month)	**4/8 or 1/2 of** moon's orbit (When the **earth lies** between the **moon** and **sun)**	**Full moon (second quarter)**	It is **completely Illuminated**

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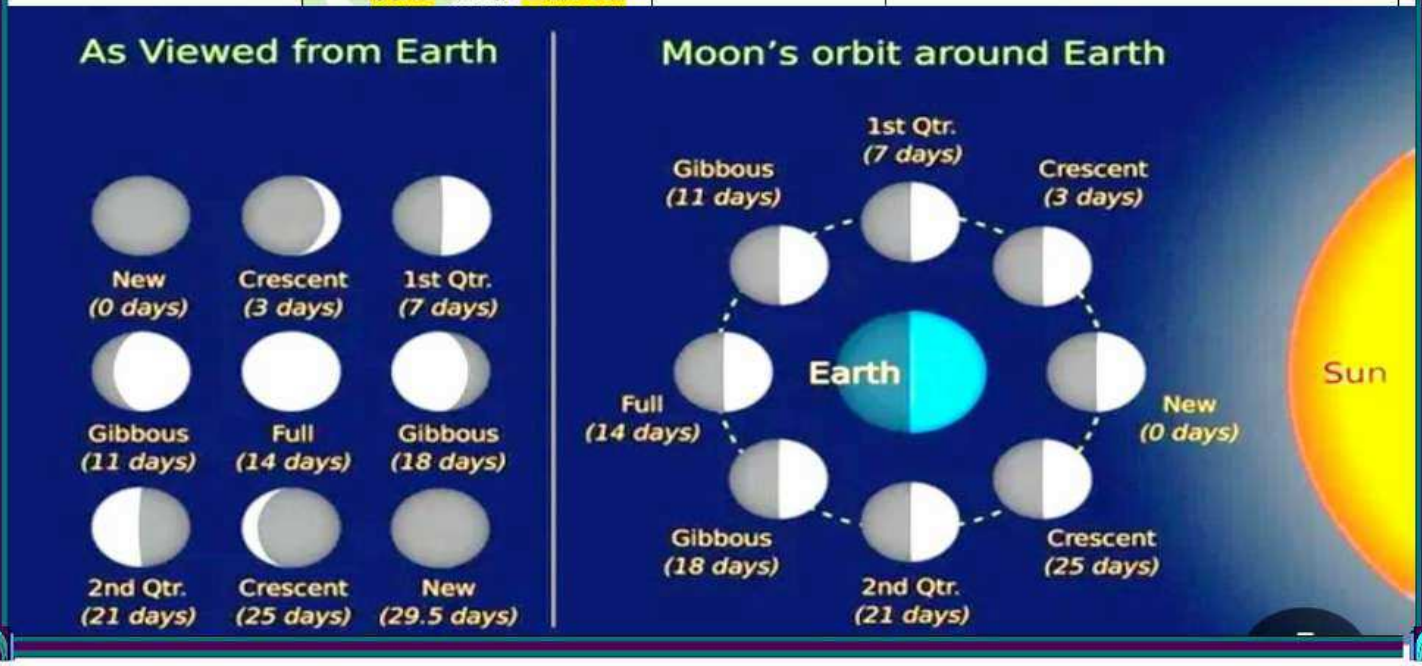
✓ **What happen when?**

The Earth is positioned between the sun and the moon in the middle of the lunar month ?

The moon appears as a complete bright disc , this phase is called the full moon phase.

2-Second half of the lunar month

Moon's visibility time	Percentage of the moon's orbit	Name of the phase	Appearance of the moon
After 17 days	⅝ of moon's orbit	Waxing Gibbous	-¾ of the side ↓ Illuminated on the left side
After 21 days (Third weekend)	⅜ or ¾ of moon's orbit	Last (third) Quarter	Half the side ↓ Illuminated
On the 26 days	⅞ of moon's orbit	Second crescent	-A small part of the side ↓ Illuminated
End of lunar month	Full moon's orbit (When the moon lies between the sun and Earth	New moon	It is completely Dark (opaque disc)



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Lunar Eclipse

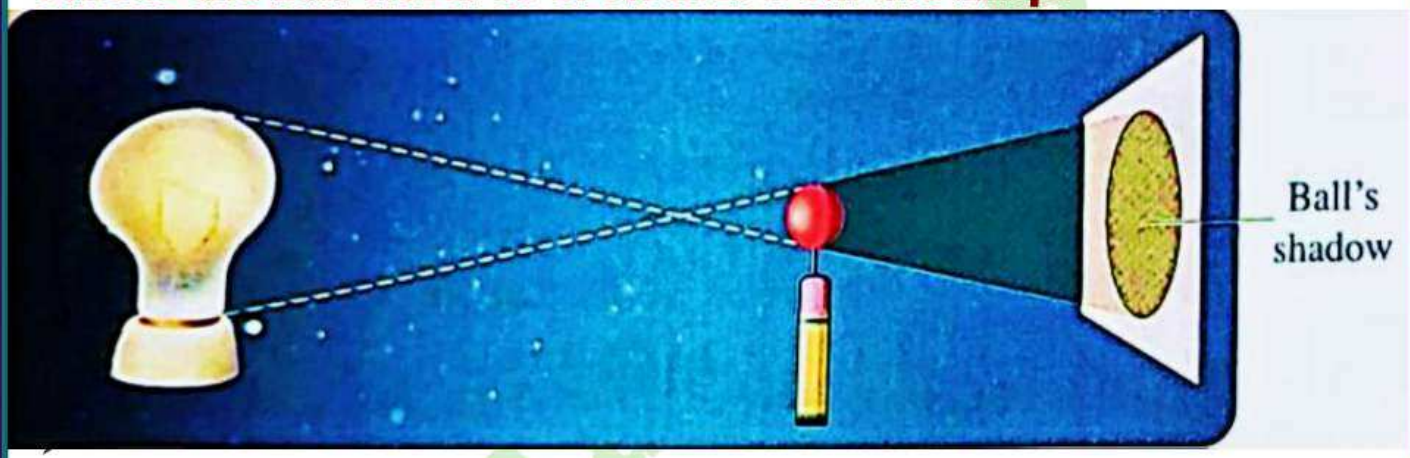
Note :-

Lunar eclipse is noticed once or twice a year that the moon phases

Lunar eclipse	**A phenomenon that occurs once or twice a year during the full moon phase, where the moon disappears gradually out of sight .**

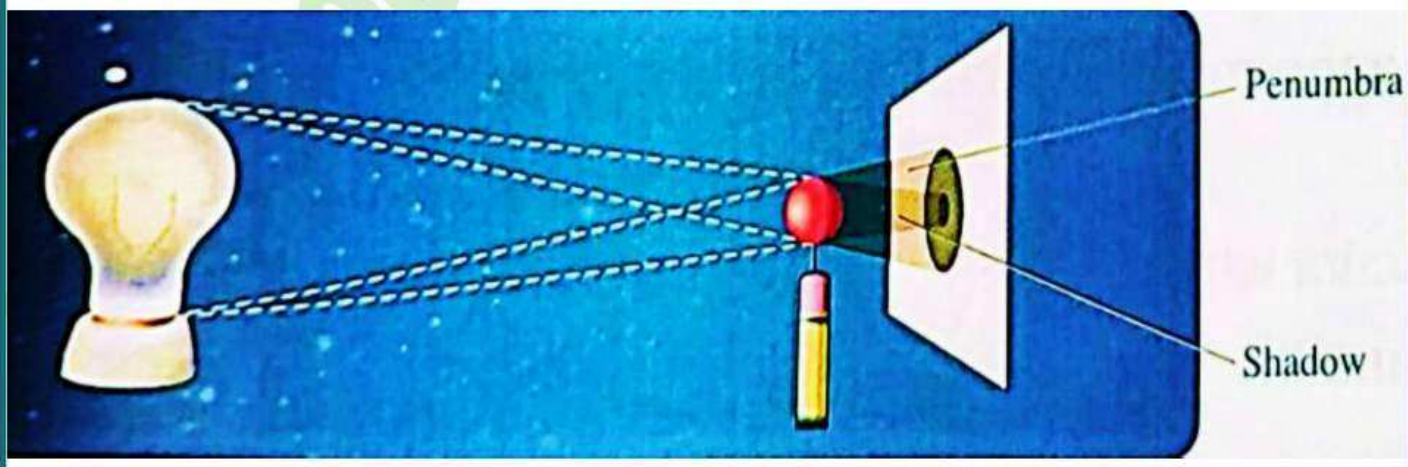
Practical Activity (the formation of shadow and penumbra)

1-Move the ball closer to or farther from the lamp.



- **The shadow expands (increases in size) as the ball gets closer to the lamp, and decreases in size as it moves farther away .**

2- Move the screen towards the ball.



Two areas are formed (shadow and penumbra)

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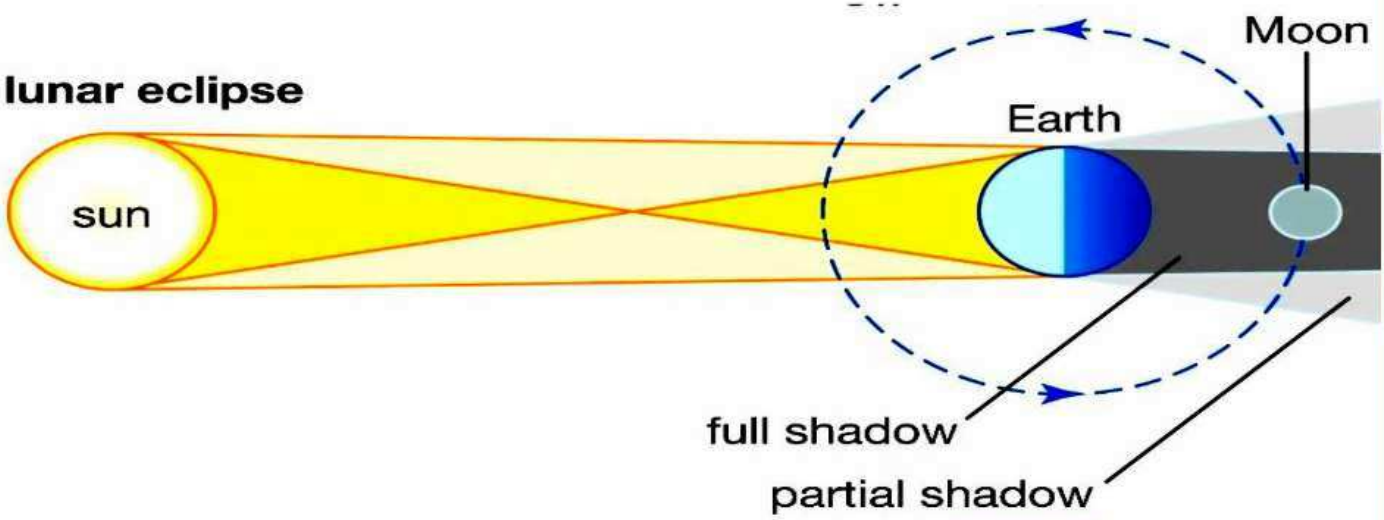

Shadow	-The **dark area** that does not receive light as a result of the presence of an opaque object in the path of the light rays .
Penumbra	-The **partially illuminated area** that receives some of the light rays , which surrounds the shadow created by the presence of an opaque object in the path of light rays .
Transparent object	-Object that **allows** the light to **pass through** it , thus **no shadow** is **formed** .
Opaque object	-Object that **does not allows** the light to pass through it , thus a **shadow is formed** .

✓Even through an object is in the path of light rays, no shadow is formed on a screen placed in front of it ? (G.R)

Because it is a transparent object that allows the light to pass through it , so no shadow is formed .

Lunar eclipse	**A natural phenomenon that occurs when the Earth , during its orbit around the sun , aligns itself between the sun and the moon , and so it blocks sunlight partially or completely from reaching the moon .**

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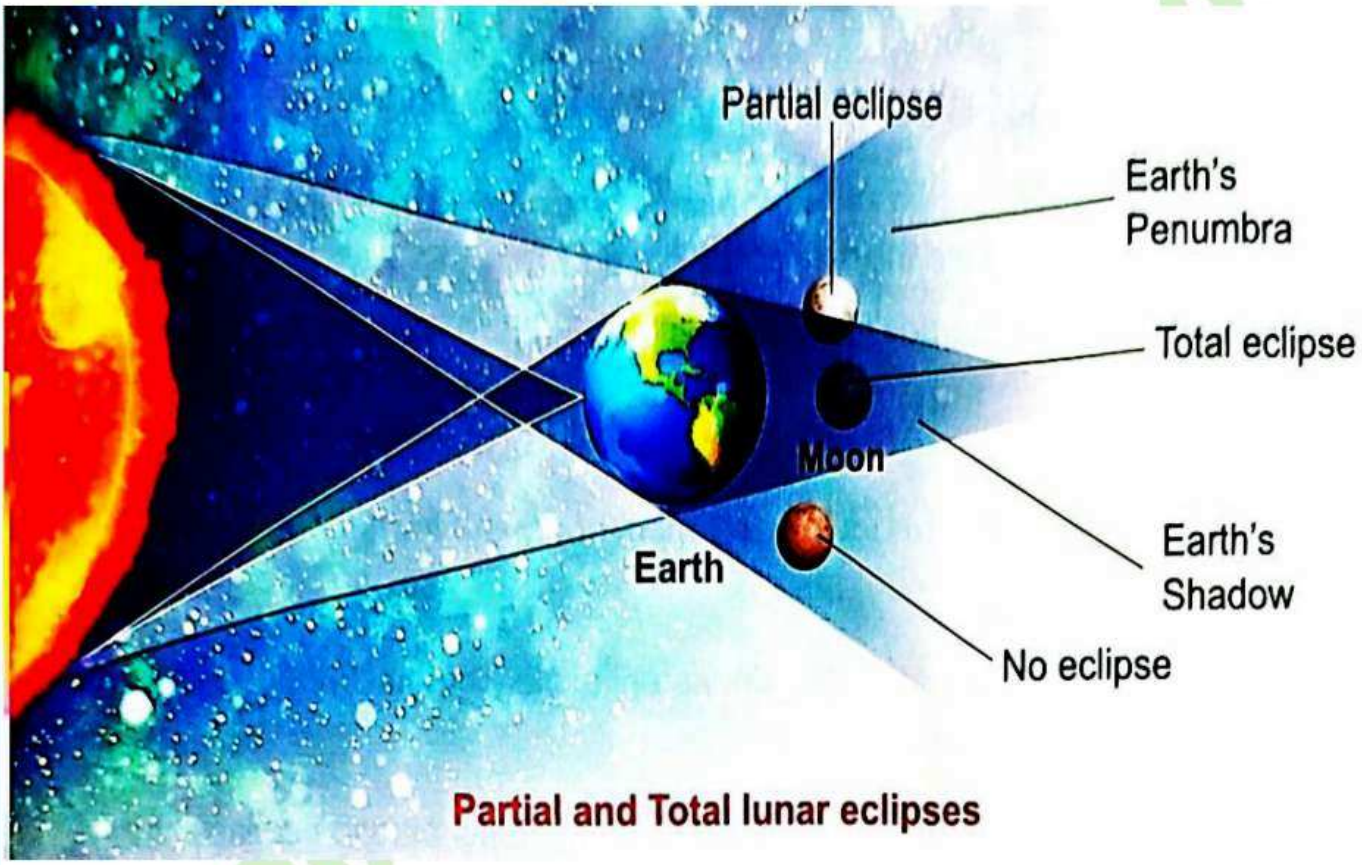
Types of lunar eclipse

Total lunar eclipse

Partial lunar eclipse



Partial and Total lunar eclipses

P.O.C	Total lunar eclipse	Partial lunar eclipse
Location of the moon	The entire moon is located within the shadow of the earth	A part of the moon's body is located within the shadow of the earth , while the other part is in the penumbra of the earth .
Appearance of the moon	The moon appears as a dark disc due to the absence of sunlight .	The moon appears partially dark

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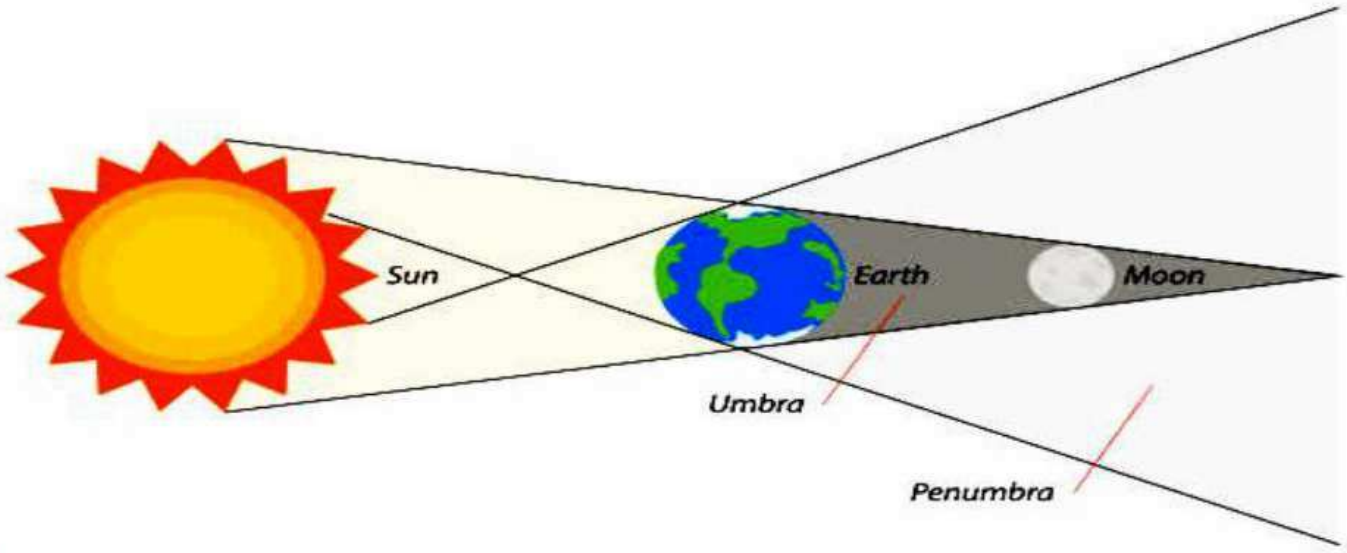
Note :

When the entire moon is located within the penumbra of the Earth, it appears as dimly lit red disc , and this is not considered an eclipse .

Lunar eclipse does not occur every time the moon is full moon phase ?(G.R)

Because the moon's orbit around Earth is tilted about 5 degree relative to the earth's orbit around the sun , so the moon is not always align between the sun and the Earth during every full moon .



LUNAR ECLIPSE

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Worksheet on lesson (2)

Q.1) Write the scientific term :-

1-The phase in which the moon is completely dark.

(……)

2-The phase of the moon on the 11th day of the Arabic month.

(……)

3-An opaque body orbiting the Earth and is the closest celestial body to it.

(……)

4-A phenomenon that occurs once or twice a year during the full moon phase, where the moon disappears gradually out of sight .

(……)

Q.2) Choose from column (B) what suits it in column (A)

(A)	(B)
1-Total eclipse 2-Partial eclipse 3-No eclipse .	a-it occurs when the moon is completely within the shadow area . b-The moon appears as a red disc c-it occurs when the moon is the new moon phase. d-The moon appears in complete .

1-…… / 2-…… / 3-……

Q.3) Choose the correct answer :-

1-The number of phases that the moon goes through during the lunar month is ……..phases.

a-6 b-8 c-9 d-7

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2-The moon takes approximately ……to complete is orbit around the Earth .

a- 24 hours b-23.5 days c-88 days d-29.5 days

3-If the moon is entirely within the Earth's penumbra , it appears as ……

a-a full moon b-a dark disc c-a crescent d-a red disc

Q4) Give reasons :-

1-An observer on Earth sees only one side of the moon ?

……

2-The moon appears as a dark disc during the total eclipse ?

……

3-The moon appears illuminated in the sky , despite being dark ?

……

Q.5) What are the consequences of :-

1-The change of the moon's position relative to Earth and the sun during its revolution around Earth?

……

2-The moon being entirely within Earth's shadow ?

……

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Model answers

Worksheet (1)

1-Write the scientific term of each of the following statements:

1-Unicellular organisms

2-Multicellular organisms

3-Ribosomes

4-Vacuole

5-Classification

2-

	Prokaryotes	Eukaryotes
Living organisms characterized by the following Characteristics	-All are unicellular -Simple in structure. -Relatively small in size. -There genetic material in the cell is found in the cytoplasm and not surrounded by nuclear membrane. -Many cell organelles are missing.	-They may be unicellular or multicellular. -Their body is more complex. -Relatively large in size. -Their genetic material in the cell is surrounded by a nuclear membrane separating it from the cytoplasm (True nucleus). -They contain many cell organelles.

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examples	-Bacteria	-Yeast fungus and Euglena. -Protozoa such as Amoeba and Paramecium (unicellular organism) -Plants like beans and animals like lion (multicellular organisms). -Fungi such as bread mold fungus and mushroom fungus (multicellular organisms

3- Stem cells in human are characterized by:

1- Their ability to renew themselves through division and produce more stem cells.

2-Their ability to differentiate into specialized types of cells found in the body.

4-Give reasons for:

1-Because their genetic material in the cell is found in the cytoplasm and not surrounded by a nuclear membrane.

2- Because its genetic material in the cell is surrounded by a nuclear membrane separating it from the cytoplasm.

3-Because they have the ability to renew themselves through division.

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5-What is meant by?

1-Classification: the arrangement of living organisms into groups based on their similarities and differences to facilitate their study and identification.

2- Microscopic organisms: they are microscopic living organisms composed of a single cell that can't be seen by the naked eye but can observed under the light microscope.

3- Stem cells: Undifferentiated cells that have the ability to be transformed and differentiated into all the differentiated cells of the body that perform a specialized function.

6-complete the following sentence:

1- structure – function

2-Bacteria – Euglena – Amoeba

3- unicellular – multicellular

4- animals – plants

5- presence of centrosomes - presence of chloroplasts large vacuole

6- higher animals – human

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Worksheet (2)

1-Compare:

-Mammals: respires through the lungs.
-Fish: respire through the gills.
-Insects: respire through the tracheal tubes.

2-Write the scientific term of the following:

1-Nutrition. 2-Tracheal tubes. 3-Cellular respiration.
4- Arteries. 5-Phloem 6-Guard cells. 7-Locomotion (Movement).

3-Put √ or x :

1-x 2-√ 3-x 4-x 5-x 6-√ 7-x

4-Give reasons for:

1-Because it depends on other producers to obtain its food.
2-Because during photosynthesis plants absorb carbon dioxide gas and produce oxygen gas, while during respiration it obtains oxygen from the atmospheric air and release carbon dioxide gas.
3-Because the heart and the blood vessels are connected in a continuous cycle.
4-Because both transport food to all parts of the body.
5-Because the leaves contain stomata through which excess water is eliminated.
6- Because it depends on other producers to obtain its food.

5-What happens if:

1-The plant will not be able to perform photosynthesis, making it unable to produce food leading to its death.
2-Toxins will accumulate in the blood, causing kidney failure.
3-The leaves will not be able to perform photosynthesis, respiration or eliminate excess water and carbon dioxide gas during excretion.
4-The organism will not obtain the main energy source and thus will not produce substances needed to build its body leading to death.
5- Stomata opening and closing will not be controlled.

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Worksheet (3)

Q.1 Choose

1- b 2-d 3-b 4-c 5-d 6-d 7-d

Q.2) Choose from column (B) what suits it in column (A):

(1-4) (2-3) (3-5) (4-2)

Q.3) Complete the following:

1- Lactic acid bacteria 2- Entamoeba Histolytica

3- Yeast fungus 4- Penicillium Roqueforti

Q.4) Choose the odd one and state the relation between the rest:

1-sulphur (essential elements for formation of carbohydrates)

2-Corn (legumes plants)

3-Dysentery (bacterial diseases)

Q.5) The opposite figure represents one type of microbes :

1- Yeast fungus.

2- A beneficial multicellular eukaryotic microbe.

3- **Nutritional importance**: it is a source of vitamin (B) complex and rich in antioxidants.

Industrial : used in making bread and ethyl alcohol (ethanol)

Q.6)

1-Washing vegetables and fruits thoroughly.

2- Not leaving food uncovered.

3-washing hands before eating and after using bath room.

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Unit (4)

workeheet (1)

Q.1)

1- sun 2- inner planets 3- outer planets 4-Venus

5- winter season 6-summer season 7-Autumnal equinox

Q.2)

1-(x) the fourth

2-(x) meteorite impacts

3-(x) around its own axis

4-(√)

5-(√)

Q.3)

1-Uranus has greenish blue colour.

2-Lead to differences in the length of shadow cast by objects throughout the day and the year.

3-The alternation of the four seasons.

5- The shadow length is long at sunrise and gradually decrease until it is shortest at noon.

Q.4)

1-sun/ planets

2-saturn / inner planets (rocky)

3-Mercury / inner planet with thick crust

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